

SPECIAL REPORT  IS COMPUTING SAFE FOR YOUR HEALTH?

# MACWORLD

The Macintosh<sup>®</sup> Magazine

July 1990 \$3.95 Canada \$4.95

## HEALTH HAZARD

*Could Your Computer  
Be Killing You?*

SEE SPECIAL REPORT PAGE 136

### GRAPHING SOFTWARE

*Charts, Diagrams, and Graphics*

### 2-D CAD

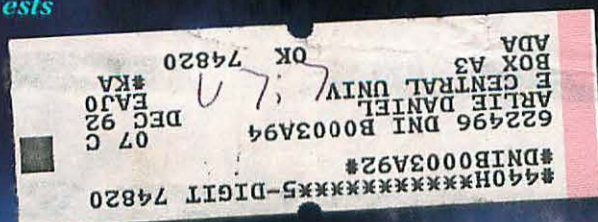
*19 Products Compared*

### PC TO MAC AND BACK

*How to Exchange Data*

### COLOR MONITORS

*17 Products: Reviews & Lab Tests*





# Preferred by nine out of ten accountants and manipulators

Consistently, people who work with numbers have some noticeable traits.

They're intelligent, organized and thorough—buttoned up, if you will.

Which explains why Microsoft® Excel has been the spreadsheet standard for Macintosh® ever since it was introduced in 1985. Today, 90% of Macintosh spreadsheet users do their calculating, manipulating, analyzing and presenting with it.

And while Microsoft Excel has always been easy to learn and use, it can now perform

all the complex functions you perform, but with labor-saving benefits.

You can easily build complex models, and conveniently link multiple sheets with a simple point and click.



So the left hand knows what the right is doing, we've added a feature that will tie your data into Microsoft Word documents. Then update that same data automatically, when

*With Microsoft Excel you can create impressive documents, choosing from 256 fonts and colors, variable row height and shading.*

## Profitability by division

## WinMark Copiers

### WxC 2000

		JUL	AUG	SEP	OCT	NOV	DEC
<b>Revenue</b> (In Thousands)	Actual	\$8,400	\$12,300	\$13,900	\$8,700	\$13,000	\$21,300
	Forecast	\$6,453	\$8,800	\$10,050	\$9,460	\$12,000	\$18,900
	Variance	\$1,947	\$3,500	\$3,850	(\$760)	\$1,000	\$2,400
	%	130%	140%	138%	92%	108%	113%
<b>Cost of Goods Sold</b>	Actual	\$1,848	\$3,198	\$3,475	\$2,262	\$2,860	\$7,663
	Forecast	\$1,549	\$2,288	\$2,312	\$1,608	\$2,640	\$3,969
	Variance	\$299	\$910	\$1,164	\$654	\$220	(\$3,969)
	%	119%	140%	150%	141%	108%	0%
<b>Gross Profit</b>		<b>\$6,552</b>	<b>\$9,102</b>	<b>\$10,425</b>	<b>\$6,438</b>	<b>\$10,140</b>	<b>\$21,300</b>

### WxC 1000

		JUL	AUG	SEP	OCT	NOV	DEC
<b>Revenue</b> (In Thousands)	Actual	\$2,184	\$3,198	\$3,892	\$2,610	\$4,030	\$5,325
	Forecast	\$1,613	\$2,200	\$2,513	\$2,365	\$3,000	\$4,725
	Variance	\$571	\$998	\$1,380	\$245	\$1,030	\$600
	%	135%	145%	155%	110%	134%	118%



# ut of ten calculating lative people.

it's been changed in Microsoft Excel.

To insure data integrity, we've even built in alerts that will warn you of such grievous errors as circular references. In fact, Microsoft Excel is so bright, it will actually review your worksheet and flag any formulas that don't fit an established pattern.

Furthermore, the search and replace function can make corrections on a global scale. And customized number formatting lets you bend the rules, allowing you to create everything from a 3-digit account code to a 17-digit part number.

Now, we've left a lot out in this short discourse, but Microsoft Excel hasn't. So be sure to ask your dealer for a complete explanation of its capabilities. And you'll see how Microsoft Excel will make your job easier and better.

Or, if you look at it a different way, you'll become a more effective manipulator. And a more efficient calculator.

**Microsoft**  
Making it all make sense

*Then you can Paste Link those worksheets and charts into your Microsoft Word documents and update them automatically.*

## MEMO:

**TO:** Shannon Pitts

**FR:** Peter Cohen

**DT:** November 13th, 1989

**RE:** Presentation to the Board

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.

The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.

To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.

We should be able to squelch any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.

And our assembly resources here in the

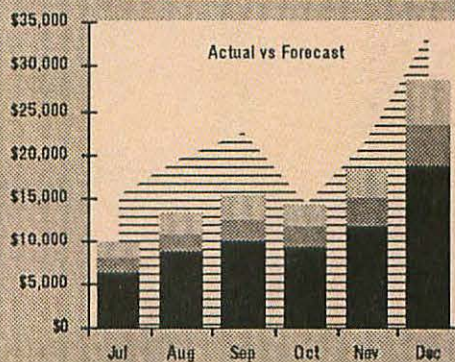
## WinMark Copiers

### WxC 2000

	JUL	AUG	SEP
<b>Revenue</b> (In Thousands)			
Actual	\$8,400	\$12,300	\$13,900
Forecast	\$6,453	\$8,800	\$10,050
Variance	\$1,947	\$3,500	\$3,850
%	130%	140%	138%

With a very respectable 9 percent share after only 18 months, we feel we can reach 15 percent by the end of the next fiscal year (see six month projection).

### FY90 REVENUE





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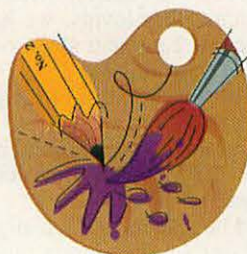


Are we in danger from constant exposure to our monitors' electromagnetic emissions? What we can't see may indeed hurt us. Macworld's critical analysis begins on page 136. (Photo by Dan Escobar.)



Control a multitude of multimedia devices from your desktop, page 119.

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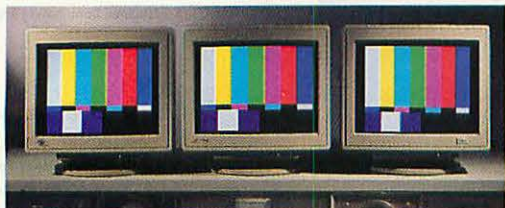
*By Deborah Branscum*

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is spreading you too thin,

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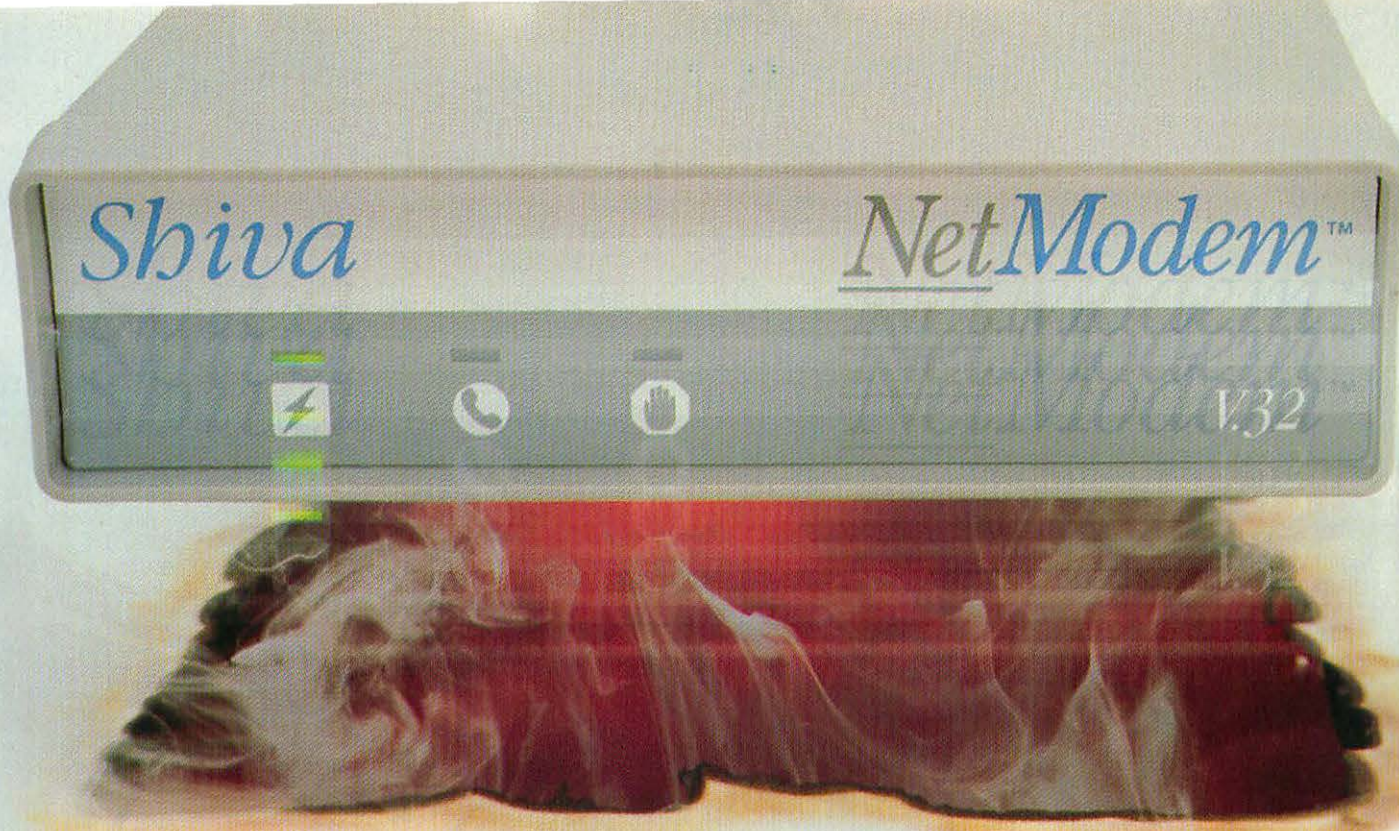
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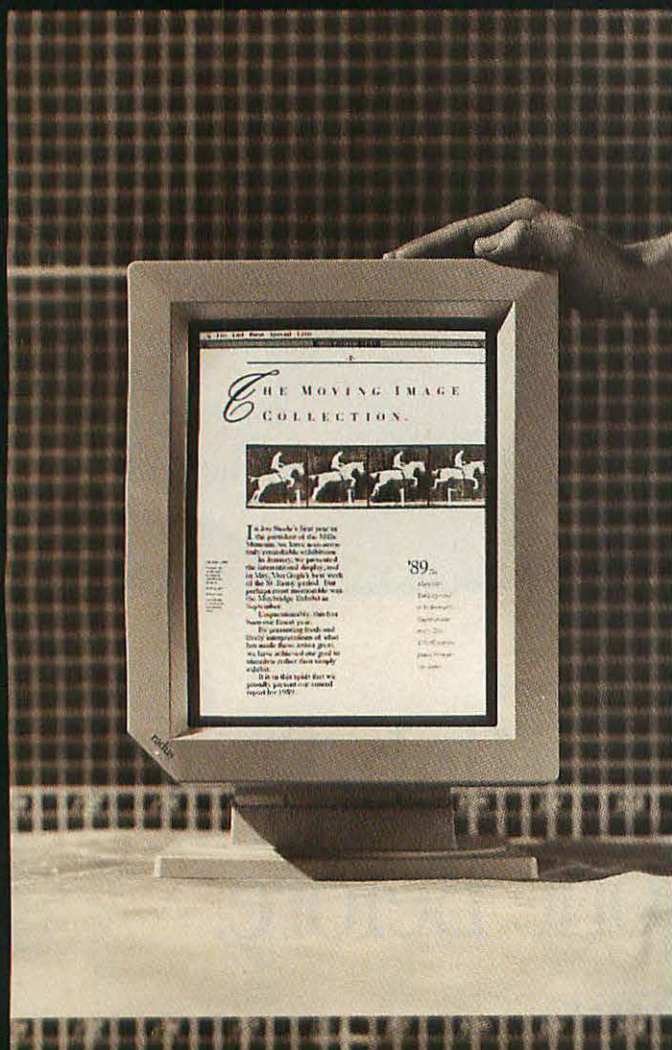
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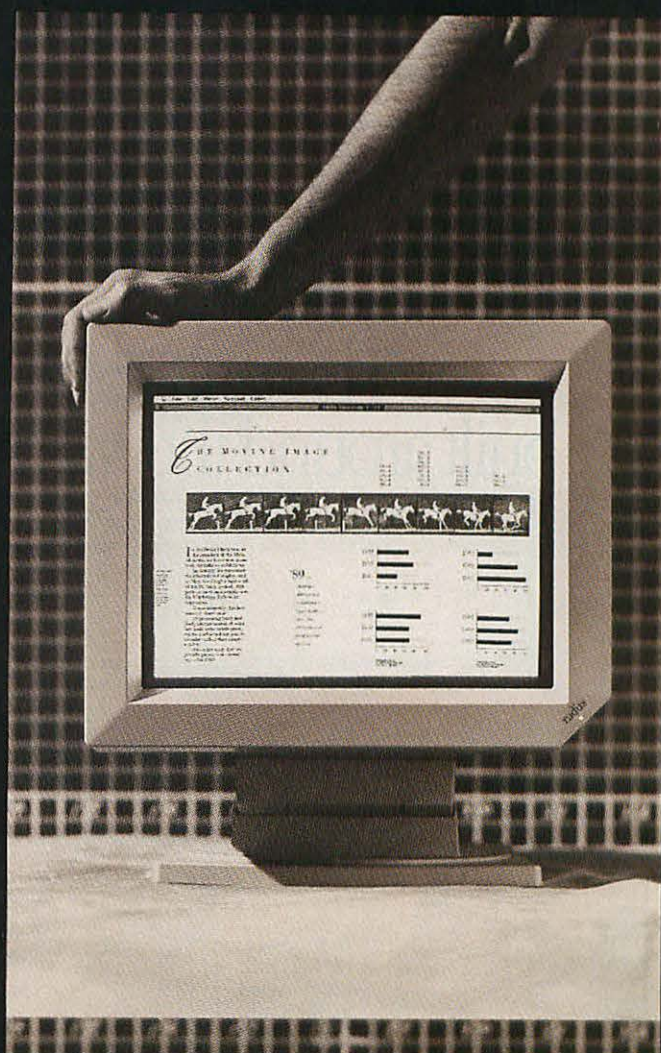
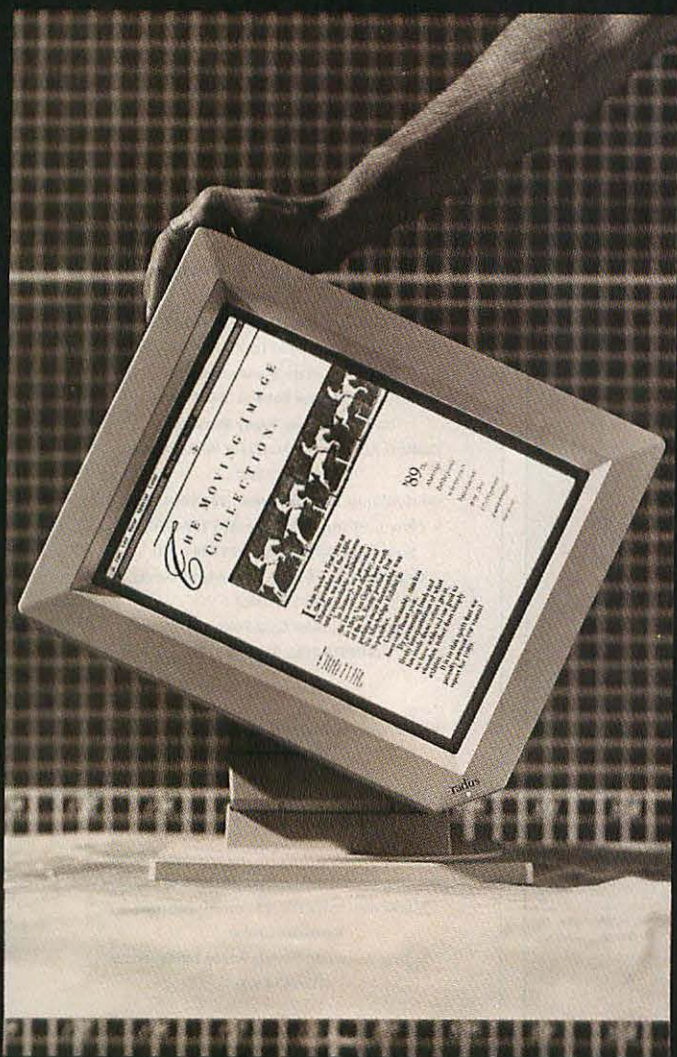
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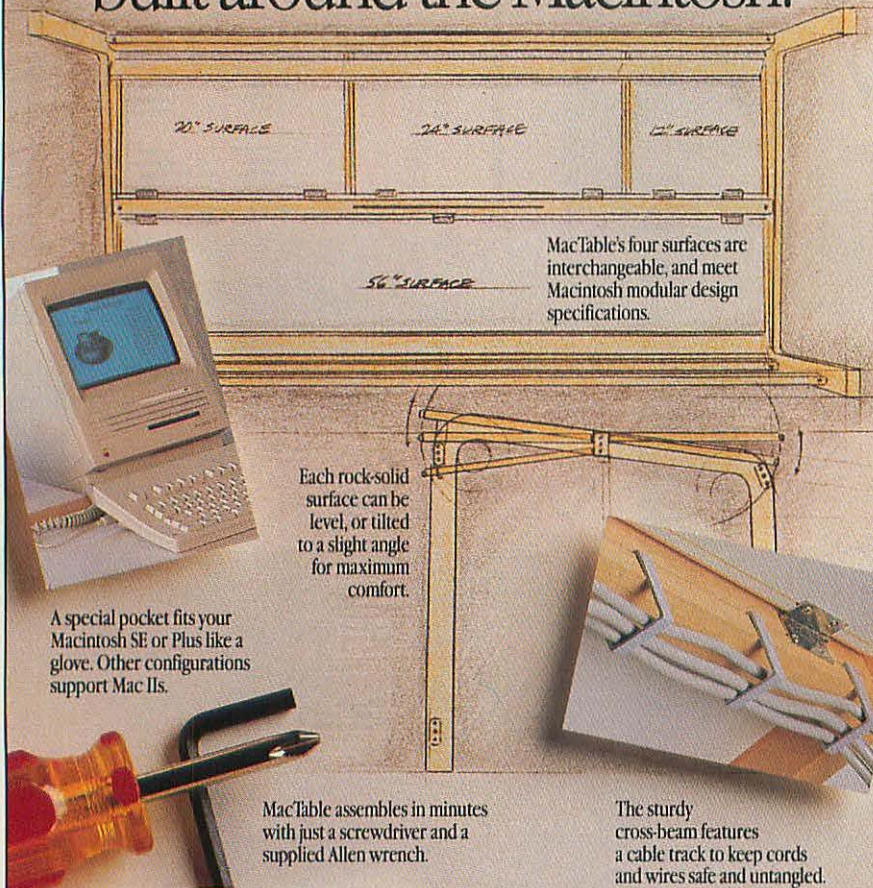
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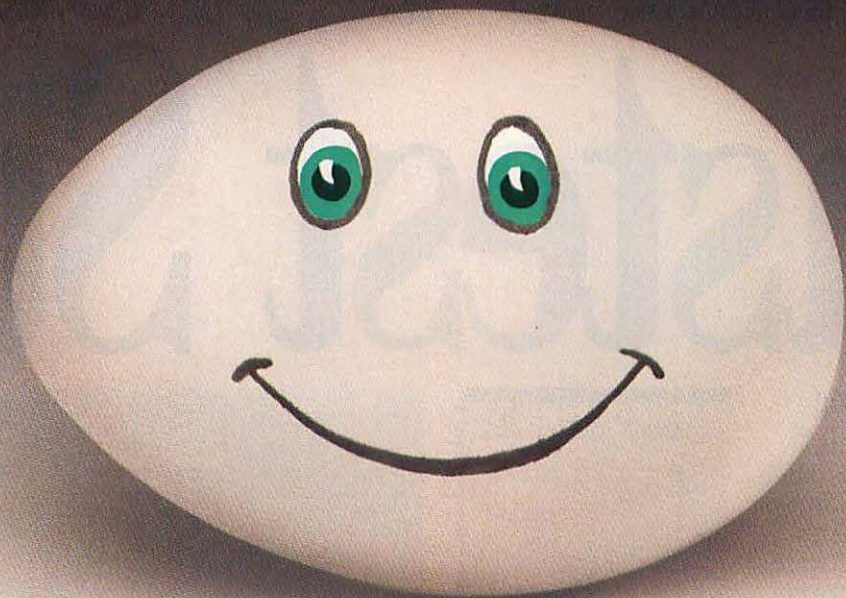
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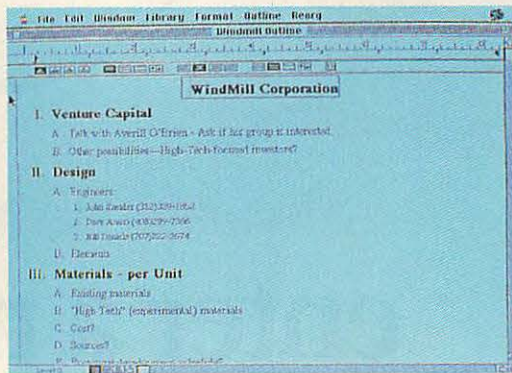
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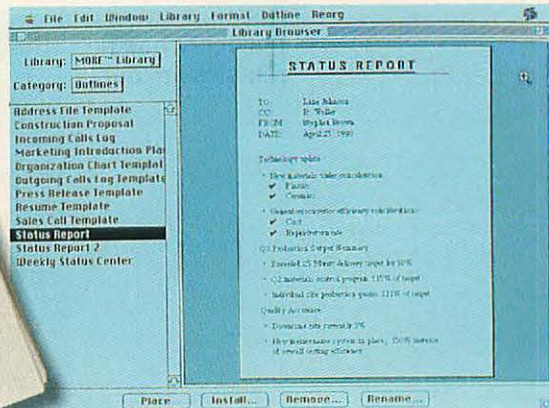
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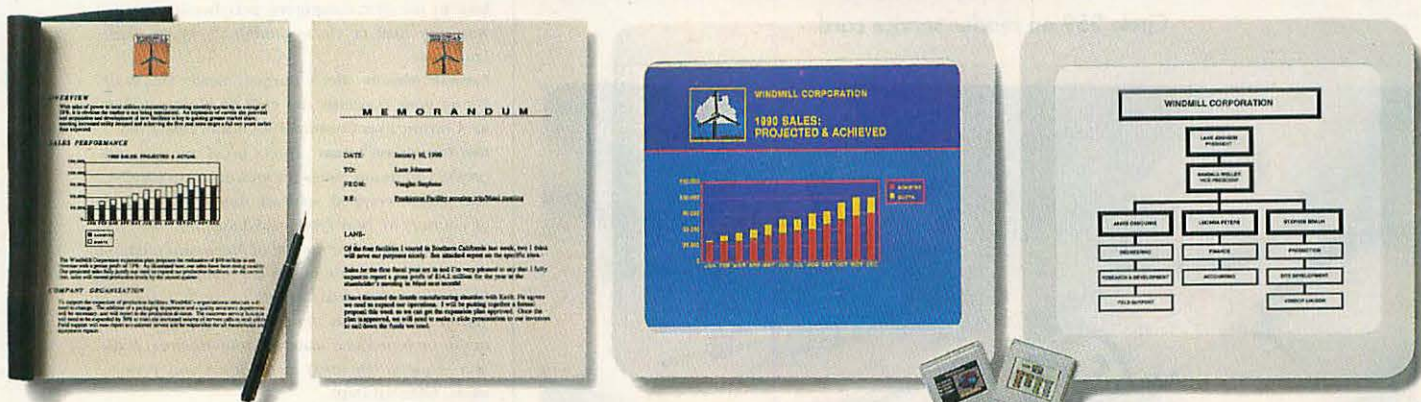
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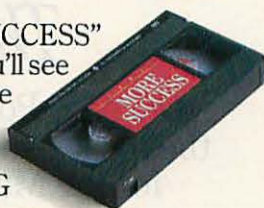
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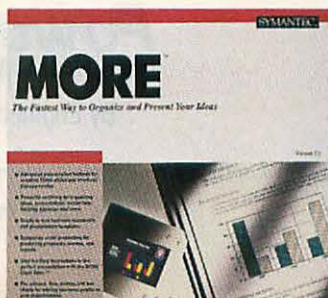
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# RETROSPECT

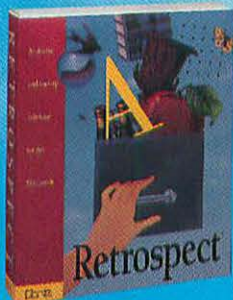
ARCHIVING & BACKUP SOFTWARE

1989 Eddy  
Award for  
"BEST BACKUP  
SOFTWARE"  
by MacUser  
Magazine.

## To Go Forward You Must Backup

On the Macintosh, creation and storage go hand-in-hand. You create. Then you store. Pretty soon, your hard disk is full of files--each one vulnerable to a hard disk crash. Retrospect will protect your creativity. And offers more than any other backup software: Archiving. Archive files to keep your storage needs in check. Retrospect supports almost any storage device and has compression, encryption, and full file selection. Run it automatically with a built-in calendar.

**Retrospect. The Best Backup  
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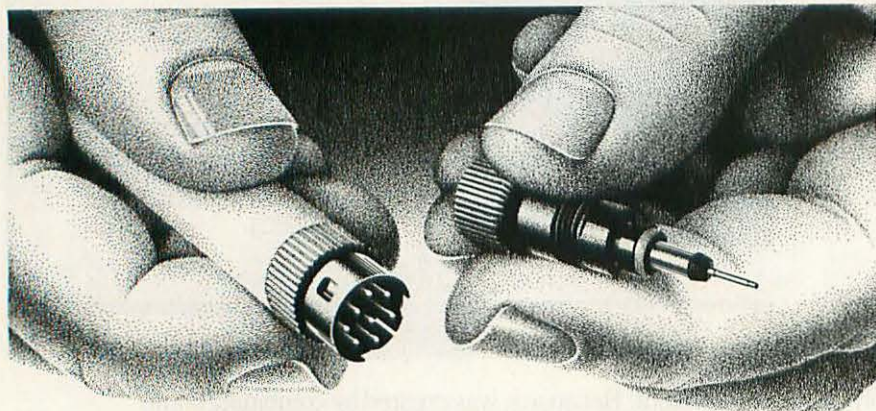


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Development Corp.

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And so is PowerDraw Version 3.0. Get to know the most powerful CAD program ever developed for the Macintosh. Intuitive. Fast. Elegant.

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DPT #696

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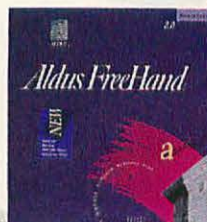
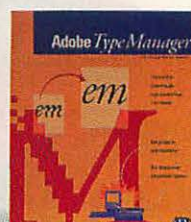
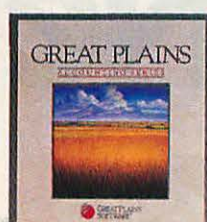
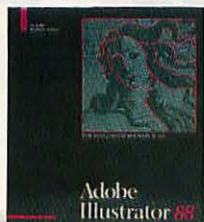
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All the Macintosh® applications above were developed in THINK C® or THINK Pascal®. Could it be coincidence? Think.

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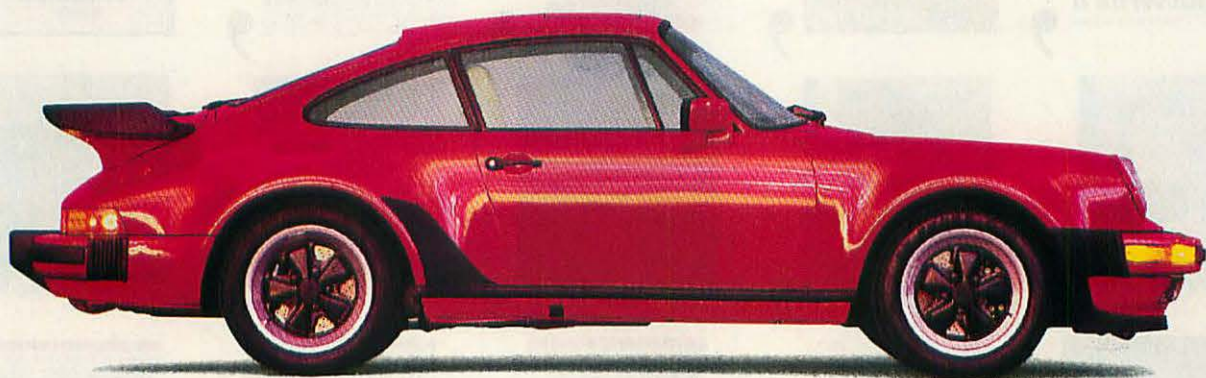
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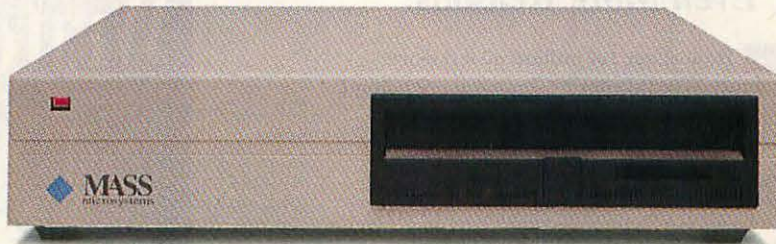


# Often Imitated Never Duplicated.





# Ditto.



## DataPak Removable Cartridge Drive.

Copies are never as good as the original. Especially with high-performance machinery like sports cars. And removable cartridge drives. DataPak was the first and it's still the best.

In fact, DataPak is the *only* removable drive to ever win three of the industry's most prestigious awards from MacUser, MacUser Europe, and MacWorld. Here's



*DataPak features dual surge-protected AC outlets and a spare fuse.*

why: **Quality.** DataPak is the only removable built with the same high-quality components and advanced cooling system that Apple uses. So while other drives may look like DataPak, they're not built like it.

**Reliability.** Only DataPak is burned-in for 24-hours to ensure dependability. That may cost a little more. But we'd rather have our technicians find any defects—instead of you.

**Safety.** Only DataPak comes with a built-in spare fuse to save you trouble. And dual surge-



*Only MASS Microsystems offers a full line of DataPak models specially designed for every Macintosh.*

protected AC outlets to save your system. DataPak is also the only removable cartridge drive to win FCC Class B certification. So you can use it both at work and home.

**Compatibility and aesthetics.** Only DataPak has a model to match the looks and footprint of every Mac. Even better, DataPak for the Mac Plus and SE has a 3 degree tilt to keep the monitor at the optimum viewing angle. And all DataPak drives work with all Mac system software. So your investment is protected.

### Free Productivity Software.



*SUM II disk utilities come FREE with every DataPak.*

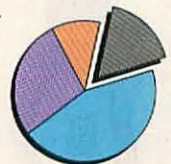
Every DataPak comes with utility software to maximize drive performance. Including PadLok™ volume partitioning and password-protection software. Diagnostic and

Defect Management software to prevent data loss. Plus a huge library of free software: SUM II, Symantec's 3-year, award-winning utility software (a \$150 value); PlatinumShare™, 4MB of today's best share-

ware according to MacUser Magazine; and ProWare™, demos of today's hottest Mac software.

**Service.** DataPak is backed by the best Technical Support and Service in the business. Including toll-free Technical Support and 24-hour drive replacement.

So while you might save a few dollars buying a cheaper drive, you could end up losing more than you bargained for. So why not see your nearest DataPak dealer today? For the address call 800-522-7979. For international distribution call 408-522-1200. And see why there's no imitation for real quality.



*PadLok partitioning software protects your valuable data.*

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### ...But Now For Even More Reasons!

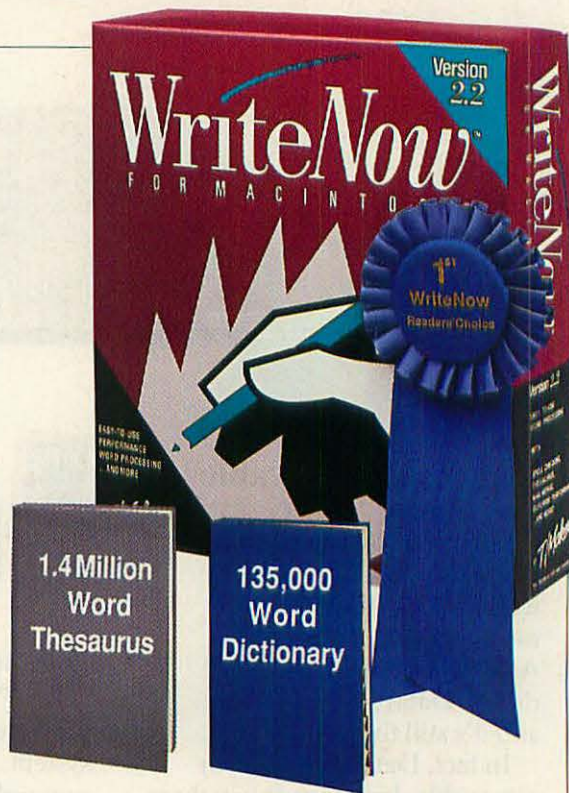
**1.4 Million-Word Thesaurus** How about 1.4 million new reasons? WriteNow now includes the Proximity WordMaster™ Thesaurus, containing 1.4 million synonyms, antonyms, compared, contrasted, and related word responses at your fingertips—it's the biggest in the Macintosh world!

**135,000-Word Spelling Checker** How about another 135,000 great new reasons? We've increased the size of our spelling checker to 135,000 words, making it the largest of any Macintosh word processor as well.

**Direct Word 3.0 and Word 4.0 Compatibility** Maybe you just need 3.0 or 4.0 good reasons? WriteNow is directly compatible with Microsoft Word 3.0 and Microsoft Word 4.0 documents.

**Over a Dozen New Features & Usability Enhancements** Or how about over a dozen new features and usability enhancements, like menu fonts, ruler guides, automatic window tiling & stacking, date formatting, powerful new format accelerators, direct input of font size, pre-designed mailing label templates for popular label sizes, and more.

**The Word Processor of Choice in the Macintosh World** Or how about just one really important reason: When you ask industry critics which word processor they use day-to-day, the answer is always the same: WriteNow. Still the word processor of choice in the Macintosh world.



#### Reviews

“WriteNow is the definitive Macintosh word processor. It's **easy to use, powerful, and comfortable**... Highly recommended.”  
—JOHN DVORAK, INDUSTRY COLUMNIST

[WriteNow] might be **The Best Program I'd Ever Used. On any computer—it's the fastest Macintosh word processor I've ever seen.**  
—JIM SEYMOUR, MACUSER MAGAZINE

Even if WriteNow is your first Mac application, you'll be up and running in no time. We rate ease of learning **excellent**. ”  
—INFOWORLD MAGAZINE

#### Awards

1989 Editors' Choice Award,  
**'Best New Word Processor'**—MACUSER

1989 Readers' Choice Award,  
**'Best Word Processor'**—MACAZINE

**#1 Rated** Word Processor in Macintosh  
**'PC Week Poll of Corporate Satisfaction.'**  
—PC WEEK MAGAZINE

#### Comparison of Leading Word Processors

	WriteNow 2.2	MacWrite II	Word	Works
Actual disk space needed:	(2) 800K	Hard disk	Hard disk	Hard disk
Thesaurus:	1.4 million	220,000	220,000	No
Spell Checker:	135,000	100,000	130,000	60,000
Mail Merge:	Yes	Yes	Yes	Yes
Format Accelerators:	Yes	No	Yes	No
Multiple Header/Footers:	Yes	No	Yes	No
Extensive Undo:	Yes	No	No	No
Retail Price:	\$195	\$249.95	\$395	\$295

#### For more information...

Registered users will receive WriteNow 2.2 upgrade information in the mail. Nonregistered users should call or write for details.

T/Maker Company  
1390 Villa Street  
Mountain View, CA 94041

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T/Maker.



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# MACBULLETIN

## **Judge Lifts 68030 Sales Ban**

The Apple world and some other parts of the computer cosmos are holding their collective breath until June 18, when a U.S. District Court judge will decide whether to reinstate an injunction that briefly prevented Motorola from selling its 68030 microprocessor. The heart of many a Mac, the 68030 is one of the objects of dispute in a patent-infringement suit between Motorola and Hitachi. Motorola has said it will appeal the original March 29 decision and that it expects to be able to continue selling the chips for the eight months the company anticipates the hearings will take.

## **Much Faster Printers Coming**

Adobe Systems says its new generation of PostScript printer controller boards will run three to seven times faster than current controllers. The new controllers are based on Mips's R3000 RISC chip. Adobe head John Warnock said that within one year the new controllers will cost about the same as the 68020-based controllers now found in many PostScript printers, including Apple's LaserWriter IINTX. Apple would not comment about using the R3000-based controller in future LaserWriters.

## **Calling All ImageWriter LQs**

Apple recently announced that its rework program for the troublesome ImageWriter LQ will end on October 31. Until then registered owners can have bad line-registration or excessive noise problems fixed for free, even if the printer is out of warranty or your AppleCare service contract has expired.

## **Crate Ceases Operation**

After several months of increasing problems and complaints of poor customer service, Crate Technologies, a manufacturer of hard drives and tape backup systems, filed for Chapter 7 bankruptcy in the Federal Bankruptcy Court in Los Angeles on April 20, 1990 (see *Conspicuous Consumer*).

## **Apple-DEC Alliance Bears Fruit**

Apple and Digital Equipment Corporation (DEC) have announced DEC LanWorks for Macintosh, a multifaceted bundle of Mac- and VAX/VMS-based software utilities and applications for Mac-to-VAX networking. The package offers three types of software for both AppleTalk and DECnet environments: basic connectivity, services and applications, and applica-

tion programming interfaces (APIs). Connectivity software includes AppleTalk for VMS 3.0, a VAX/VMS-based AppleTalk router and AppleTalk-to-DECnet gateway, and DECnet Phase 4 protocol driver for the Mac. Available services and applications range from an AppleTalk Filing Protocol (AFP)-compatible file server and print server to VT-320 terminal emulator and VMS Mail client application for the Mac. DEC LanWorks also provides Digital Document Interchange Format (DDIF) translators for MacPaint, PICT, and MacWrite file formats and CL/1 front ends and back ends for DEC's Rdb database, in addition to a number of network-management utilities. Single-user client licenses for DEC LanWorks are available from DEC for \$295. For more information, call DEC at 508/493-5111.

## **The Desk Set**

Zedcor is planning to enter the integrated-package market with a set of seven desk accessories that will list for \$399.95. The new package, tentatively called Desk, consists of DeskCalc, a spreadsheet with charting capability; DeskCom, a telecommunications program; DeskSecretary, a calendar program that issues reminders; DeskWrite, a word processor; and DeskFile, a database. The package also includes DeskPaint and DeskDraw, Zedcor's 32-bit color paint and draw programs. The DAs' features work together—for example, forms from DeskFile can be copied into DeskDraw and modified, and changes will be updated automatically in DeskFile. For more information, contact Zedcor at 602/881-8101.

## **Descartes to Challenge GeoQuery**

A Lyme, New Hampshire, start-up is developing a \$995 data-mapping application that will be similar to Odesta's GeoQuery but will have a much wider range of features. Intermap's Descartes will be able to map data by point, line, or area; layer different data sets on a single map; and zoom from a national level down to roughly the size of a city block. Besides mapping, Descartes also generates bar charts and tables for reports, and its database is directly accessible to the user. Descartes will ship with zip codes, major cities, interstate highways, and demographic information for U.S. states and counties; other kinds of information will be available at additional cost. For more information, contact Intermap at 603/795-4751.

(continues)





### **Storage Dimensions' 1GB Drives**

Storage Dimensions has announced a hard disk drive that stores 1020MB—just over a gigabyte. The full-height, 5¼-inch drive comes in several incarnations: the MacinStor 1020 II/i is for internal use in the Mac II, IIfx, and IIfx; the external MacinStor 1020-HC1 is for the Mac Plus and up; and the external MacinStor 2040-HC2 is a dual-drive device that stores 2040MB, also for the Plus and up. The data-transfer rate for the drives ranges from 15 to 24 megabits per second, with a 15ms average seek time, according to Storage Dimensions. The 1020 II/i will list for \$8799, the 1020-HC1 for \$8999, and the 2040-HC2 for \$17,495. For more information, contact Storage Dimensions at 408/879-0300.

### **New Publisher Launches Mac Line**

Several of Preferred Publishers' key employees have founded a separate company and plan to publish low-priced Macintosh software. The first four products that Baseline Publishing plans to release are Flashback, a scriptable, network-capable backup utility that will list for \$99.95; Cheque, a \$49.95 home finance package; 1 Shot Worksheet, a \$79.95 desk accessory combining a forms designer and spreadsheet; and INIT Manager, a \$49.95 utility that, among other things, generates a detailed report about your INITs' memory use and System patching. For more information, call Baseline at 901/682-9676.

### **MegaGraphics Shows its Colors**

The latest from MegaGraphics is a series of color display products including a 24-bit graphics adapter board and two 16-inch monitors. The \$4799 MegaScreen 2024 adapter has a 69Hz refresh rate and supports the company's 16-inch and 19-inch monitors at up to 1024-by-826-pixel resolution. The \$3595 MegaScreen 16" WYSIWYG Display subsystem combines the company's existing MegaScreen 2008 8-bit color board with a Sony Trinitron tube and displays 75 pixels per inch and 832 by 656 pixels at 69Hz. The MegaScreen 16" High-Resolution Display, which is intended for CAD applications, offers 1024 by 826 pixels at a compressed 88 pixels per inch. It can use either the MegaScreen 2008 board or the MegaScreen 2024. With the 2008 adapter, the monitor lists for \$3695. A version for the SE/30 lists for \$3695 including the MegaScreen 3008 adapter board. For more information, contact MegaGraphics at 805/484-3799.

### **Mass Micro Shows Plus, SE Video**

Mass Microsystems introduced a video-production device for the Mac Plus and SE that creates monochrome text and graphic overlays and combines them with full-motion color video from other sources. The Color/Space Plus/SE can output in composite NTSC or S-video formats to any video recording or display device. Slated to ship in May, the external SCSI device will retail for \$1895 and require a \$100

Video Adapter Kit that must be installed by the dealer. For more information, contact Mass Microsystems at 408/522-1200.

### **Microlytics' Way with Words**

Microlytics is developing a utility, called Inside Information, that classifies words into a wide range of hierarchical categories and makes it possible to find an exact word from a rough definition. Travelling down the hierarchy is somewhat like browsing an outline or tree chart, and the 65,000 words at the bottom level have definitions. You can type in an approximate definition of a word you're looking for using AND and OR logic, and refine your search as Inside Information suggests possible words. Inside Information will list for \$119. For more information, contact Microlytics at 716/248-9150.

### **MacTools Goes Deluxe**

Central Point Software's latest set of utilities is called MacTools Deluxe, and packs a feature set comparable in scope to Symantec's SUM or the Peter Norton utilities. MacTools Deluxe includes DAs for locating files, partitioning a hard disk, and encrypting data; a hard disk backup application; a disk defragmenter; Fast Copy, for making multiple copies of floppy disks; Rescue, for recovering damaged or deleted files or disks; and Mirror, which keeps track of directory information in a separate file to facilitate recovering lost files. MacTools Deluxe will list for \$129. Central Point Software's copy-protection-breaking utility is now only available in Copy II Mac, which will be updated later this year. For more information, contact Central Point Software at 503/690-8090.

### **DocuComp Expanded**

DocuComp, an application that compares two versions of a document and shows changes by underlining and striking out text, is getting some new abilities in version 1.5 including: jump to a line by number; show changes in color; mark or ignore hidden text; alternate printing change bars on left- and right-hand pages; print change bars without marking changed text. It also adds an area for making notes at the bottom of the page. The list price remains unchanged at \$159.95. For more information, call Advanced Software at 408/733-0745.

### **Ballade of the Mac Café**

Dynaware is developing Ballade, a 16-track MIDI sequencer, tone editor, and tone librarian for the Roland MT32, CM32L, and CM64 keyboards. Ballade has a mixer window that looks and works like a real audio mixing board. Scores can be edited and printed with Adobe's Sonata font. Ballade will come bundled with the Apple MIDI Manager and imports and exports standard MIDI and IBM Ballade file formats. The price will be between \$250 and \$300. For more information, call Dynaware at 415/349-5700. ■



# MegaMac™

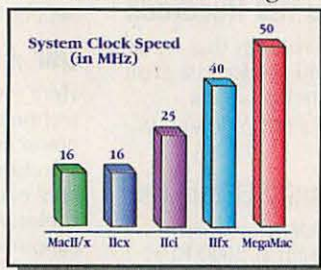
## The Ultimate Macintosh® Desk Accessory.



**W**e bet you're already figuring how you can justify this one — even at \$78,000! Fact is, you're probably not alone. Most Mac users are *desperate* for anything that can enhance the performance of their systems.

### Your Mac Dreams Have Come True.

Here's good news for all you despairing Mac users. Our new MegaMac™ doesn't really cost \$78,000 — or anywhere near it. But hook it up to your Mac II, IIfx, IIfx, IIfx or IIfx and you'll be surprised that it doesn't. That's because the MegaMac can transform your trusty old Macintosh into a 50MHz 'micro-mainframe' that can run up to 33% faster than Apple's newest and fastest Macintosh, the IIfx. In fact, with a MegaMac installed, your Macintosh will rival systems costing in the six figure range.



CPU Performance Comparison

### As User-Friendly as the Mac Itself.

If you're thinking the MegaMac is just another accelerator board, think again. The MegaMac is a totally self-contained *CPU Performance Extender* — with its own memory, micro-processor and power supply. There's even an internal, 'fx' style Processor Direct/NuBus expansion slot and an extra 5 1/4" drive compartment for installation of a high performance disk

or tape back-up device. Plus, unlike some accelerator boards that require tedious and tricky Macintosh circuit board modifications, the MegaMac connects to your Mac via a snap-in NuBus accessory card. There's no soldering, no tearing your system apart and no complicated software to install. Just plug it in, power-up and hold on to your socks!

The secret to MegaMac's astonishing performance is its proprietary design. A 68030 50MHz processor coupled with 64K of 12 nanosecond write-through™ caching and on-board, high speed dynamic RAM (up to 64 megabytes) provides blistering fast program execution. The bottom line? In a word, p-r-o-d-u-c-t-i-v-i-t-y... gains greater than you ever imagined.

### The NewCo Three-Year Protection Plan.

Of course, no matter how innovative a new product might be, it's no better than the company that backs it. That's why every MegaMac comes with an incredible three-year factory warranty and a 31-day 'try it/buy it' satisfaction guarantee. We can afford to stand behind our products so well because we've been making microcomputer products even longer than Apple — nearly 18 years now!

Worried that you can't afford a \$78,000 Mac desk accessory? Well, don't. Call us at **1-800-662-9005** with your justification for owning a NewCo MegaMac™. If it's a good one, a really good one, we might just knock off fifty, sixty — maybe seventy thousand dollars.





# Save Enough On Our To Buy Our #1



**\$347**  
M20

**New, Lower Price – Includes Cartridge!**

**\$697**  
RM42



Annual Mailing Database  
Customer Database 20,000 names  
Spring Catalogue: Complete  
General Ledger Fiscal 1989  
Network Backup: 5/4/90

**“Order today, it’s on your desk tomorrow.”**



Ronald Elbensteiner, President/CEO

## “Editors And Customers Love It!

The technology behind our RM42 is the first that editors unanimously rallied around. Editors, concerned about reliability, torture tested the cartridges (one even survived an accidental flight of stairs). Our RM42 delivers infinite storage on 42Mb cartridges, and it does it faster than most hard drives (20ms).

Editors also love our M series drives.

*“If I could choose from all three manufacturers . . . I’d prefer the Mirror”* – MacUser

Customers are using our RM42 removable drives everywhere and for everything:

- Publishers in New York are organizing projects by cartridge
- Designers in Sioux Falls are archiving entire clip art libraries
- Many of our customers are backing up data for the very first time with our RM42!

*“Your [RM42] appears to be better built . . . and most importantly, it was quiet. Even better was your service. You have a product and personnel to be proud of.”*

— Judge E.R. Wedoff, Chicago, IL

## We Repair The Competition's Drives



... and we've seen them all (Apple, Jasmine, SuperMac, GCC, PCPC, Ehman, and others). We've learned a lot about how (and how not) to build a hard drive. Most companies don't employ ESD static protection, pre-testing of sub assemblies, or utilize gold plated contacts. We do. So rest easy, your precious data is in good hands.

## Factory Direct Saves You Hundreds

It's because of our direct strategy that we can deliver all this product and service at a great price. We eliminate the confusion and expense of middlemen. It's just you and us – the folks who build them.

## Downtime . . . Practically Eliminated

You're not buying bookends. These are mechanical devices that spin at 3600 RPM for their entire life. That's why we created MirrorLoan, an overnight program that speeds a loaner to you. It's just one of the essential services you shouldn't be without.

## We Hand Test Each M Series Drive

Size (Mb)	Int.	Ext.
20	\$267	\$347
30	317	397
40MP*	417	497
45	367	447
60	—	547
80	—	597
80MP*	667	747
105MP*	717	797
200MP*	1117	1197
290MP*	—	1997
580MP*	—	2497

\* MP designates premium drive

While most companies sample test, we test every drive so the drive you receive is hand tested. It arrives pre-formatted, and loaded with 10Mb of software. Inside are the best and fastest components available (Quantum, Imprimis, Seagate), an international power supply, SCSI switching, fan, and cables.

## Our #1 Removable: The RM42

Here's what you get for \$697: Proven Syquest technology, full steel chassis, international power supply, convenience outlet, SCSI selection, RFI/EMI filtering, ultra-quiet fan, gold plated contacts, and all necessary cables. And it's backed with the longest supported warranty in the industry. It's everything you'd expect from a \$1,500 removable for \$697.

Remember, order today, it's on your desk tomorrow. ☺



**\$827**

**RM20 Removable Drive**



**\$897**

**150Mb Tape Backup**

**Free Software (\$250 Value)**



**\$3497**

**600Mb Erasable Optical**

**Price Breakthrough!**



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**MirrorImage Printer**

**FREE OCR Software!**

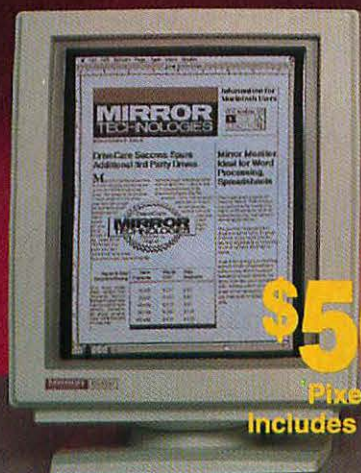


**\$797**

**VS300 Flatbed Scanner**



# PixelView II Display Removable Drive

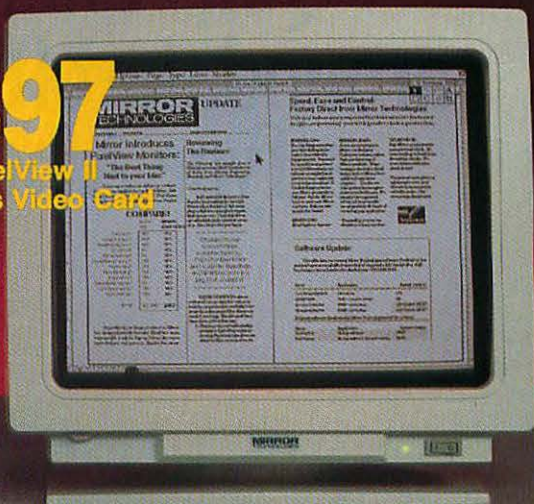


**\$567**

PixelView I  
Includes Video Card

**\$897**

PixelView II  
Includes Video Card



**"I want you to test drive one for 30 days: Love it or Return it!"**

*R. Eibensteiner*  
Ronald Eibensteiner, President/CEO

## "It Took Time To Build A \$1,700 Display System For \$897

We sourced tubes from the same folks as Apple. We chose the same phosphor. We tuned the system to 78hz vertical refresh rate to eliminate annoying flicker. And we built in enhancements like pop-up menus, sizable cursor and menu bar, screen saver, screen copy and more! With all this for \$897, what'll you do with the \$800 difference? (hint: check out our RM42)

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WYSIWYG	yes	<b>yes</b>
78hz vertical refresh rate	no	<b>yes</b>
Tear-off/Pop-up menus	yes	<b>yes</b>
Cursor sizing	yes	<b>yes</b>
Menu sizing	yes	<b>yes</b>
Screen saver	yes	<b>yes</b>
Screen copy*	no	<b>yes</b>
Full year warranty	yes	<b>yes</b>
Dealer Markup	yes	<b>no</b>
Street Price	<b>\$1,695</b>	<b>\$897</b>

(Best Street Price 4/1/90) \*Mac II, SE/30

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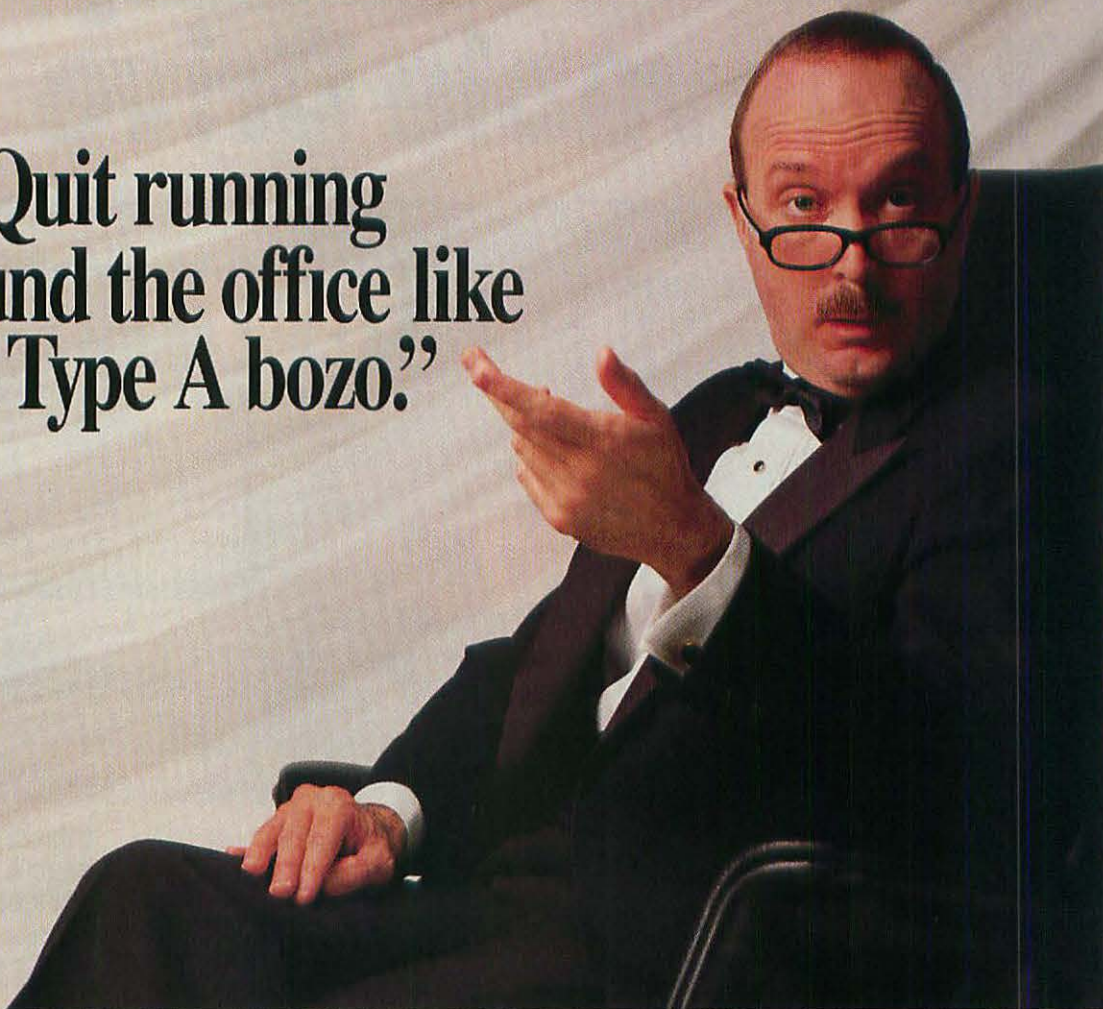
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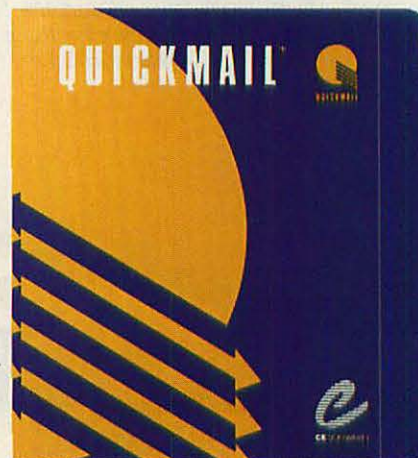
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# Is Your Computer Killing You?

INDUSTRIAL-AGE PROBLEMS GIVE WAY TO INFORMATION-AGE PROBLEMS

T

BY JERRY BORRELL

his month we face the issue of whether low-frequency magnetic emissions from personal computers, especially from the monitors connected to computers, may cost you your health. One of our own designers put it most succinctly as

he worked on his Mac to create elements of our cover article and learned more about the article's conclusions: "You feel kind of betrayed. This tool, that you've heard about all of these years as the thing that can do so much, may be killing you."

## Why Is Macworld Concerned?

Good question, since the issue is based upon a larger context, that is, the likelihood that electromagnetic fields of certain frequencies may affect human health, specifically hormonal secretions, intracellular activities, and the immunologic abilities.

Your next question may be, Why raise the issue in *Macworld*? After all, ELF (extremely-low-frequency) magnetic emissions aren't unique to Macintosh computers and their peripherals. Why Macs and their peripherals when there are over 20 million IBM PCs and clones in use? One answer—because no other computer magazine has had the temerity to question whether the industry upon which its livelihood depends may be responsible for long-term health problems. We are a computer magazine, extolling the virtues



MARK FOX

of personal computing in each issue, so it is our responsibility to tell our readers if they're in danger, rather than protect the short-term interests of industry. And that (as Johns-Manville of asbestos ill fame might tell you in retrospect) could well make the industry more viable in the long run.

As recently as last December, *PC Magazine*, the largest computer magazine in the world, took the summary stance that "Even if the worst of the effects attributed to ELF prove true, it's likely that you face far greater risks from other forms of pollution (such as cigarette smoke you inhale, either

your own or that of coworkers), the cholesterol in your bloodstream, and the peanut butter you spread on your noontime sandwich." A cavalier analogy that downplays the links between ELF emissions and several forms of cancer.

## If This Were Really True the Government Would Have Warned Us

Let's play a game. A memory-recall game. I'll write several words or phrases; you read them and see if you can find any theme linking them: lead, mercury, asbestos, radium, coal dust, cotton dust, beryllium, benzene, DDT, PCB, dioxin, ethylene dibromide, ethylene oxide.

Any luck? No? OK, here are some hints. Name industrial chemicals that are capable of killing both workers who produce them and people who use them in their work. Substances that both government and industry have at one time claimed have no ill effects.

The truth of the matter is that government, regulatory bodies, and industry do not have a good track record of protecting consumers.

In Alan Derickson's chapter of *Dying for Work: Workers' Safety and Health in Twentieth-Century America* (edited by David Rosner and Gerald Markowitz; Indiana University Press, 1987) he writes about the conditions for workers during the industrial boom period of the 1890s. "Beneath its gleaming surfaces the gilded age



[1890s] was also the 'leaded age' in which an evolving disease-intensive technology posed a multitude of health risks for American workers." As I sat reading Derickson's chapter describing how miners died of black lung, how car painters died of fumes from some of the first autospraying machines, how felt-hat makers went slowly mad, how radium dial painters became palsied, I came to realize that we are, just as our grandparents before us, in the midst of the latest technological/industrial maelstrom, facing a new set of health-related issues little understood by our peers.

And as was the case at the turn of the century, it will be up to the users of technology, rather than manufacturers or industry, to identify health and technology issues.

#### **Let the Arguments Begin! Or, Terminology and Etiology, Part I**

So often over the last 90 years, in the case of each of the substances listed above, each claim of an impact on health began with a long period of denial. The period of denial is typically followed by a period when terminology obfuscates the issues, when the public does not have a clear understanding that there are problems. During this time people continue to grow ill or die while scientists and technologists argue over what the real issue is.

It goes something like this. Lots of Vietnam veterans have developed cancer. Many of them were exposed to Agent Orange, containing dioxin, perhaps the most poisonous substance in the history of the earth. So how do you prove that Agent Orange is the cause? And why should your suspicions prevent Dow Chemical from using a perfectly effective chemical in its pesticides?

Another case more to the point. You may have read a story in the *New York Times* last year—just after the release of Paul Brodeur's book, *Currents of Death* (Simon and Schuster)—in which IBM announced that it has taken the stance that monitor and radiation issues can be solved. Furthermore, it was the company's position that its products will incorporate IBM's own patented technology to negate the problem.

The trouble is that the issue addressed in the *New York Times* relates to VLF (very-low-frequency), and not ELF, electromagnetic fields. I am not accusing IBM of clouding another issue in the all-too-disassociated mind of the public. Nor do I fault the reporter who filed a story that seemed like a recap of an IBM corporate press release. I merely point out that much of the reading public probably thought that IBM had resolved that troublesome issue they'd been hearing about on television (Brodeur was interviewed by Ted Koppel on "Nightline").

The real problem, you see, lies not in the dangers that technology can produce, but in the people who control the instruments of business that produce the technology. For it is their tendency to try to disprove that any harm will come from new technology, rather than to seek to protect the lives of those who pay to use the new technologies. And so we spend a great deal of time during which the economic rights and well-being of the companies producing the technology are protected at the expense of the well-being of the majority (the public).

#### **Pathology and Epidemiology**

At some point in the argument, the various parties are able to agree on terminology. They may even be able to agree on certain aspects of the problem. Mining or milling companies come to recognize that many of their workers have similar respiratory diseases. The companies are forced to recognize that their mines or spinning mills are poorly ventilated. Still, they refuse to admit that the two are related, and stand dumb before thousands of suffering workers. Innocent until proven guilty, they respond.

This is the stage at which the sufferers, and whatever responsible parties may take up their cause, are asked to describe the mechanism, the actual physical process by which the conditions of their work cause the disease or medical conditions that are at the heart of the argument. It has never been a situation favorable for those raising the issue. The men in the coal mines spitting up blood found no support from mining companies by pointing to the number of similarly affected miners—instead they founded

unions, which eventually became powerful enough to instigate legislation to protect the miners—despite a lack of scientific evidence that their work conditions caused their illnesses.

Indeed the task is even harder today, for the burden of providing scientific proof falls upon those least able to afford extensive research; while industry, government, and trade associations often bring to bear all their economic strength to discredit, deny, and disprove any evidence that may be brought forward.

While there are many studies that show problems with VLF electromagnetic emissions (relating VLF emissions to birth defects among pregnant women using computers or relating VLF to the incidence of cataracts), there has been very little study among humans with regard to the long-term effects of ELF emissions. To be certain, there are over 20 research studies indicating that ELF emissions may cause problems, but to date we have no long-term studies on the effects upon human health. Some studies were begun, but researchers, once given data indicating that human health is likely to be affected, could hardly continue to use human subjects as laboratory animals.

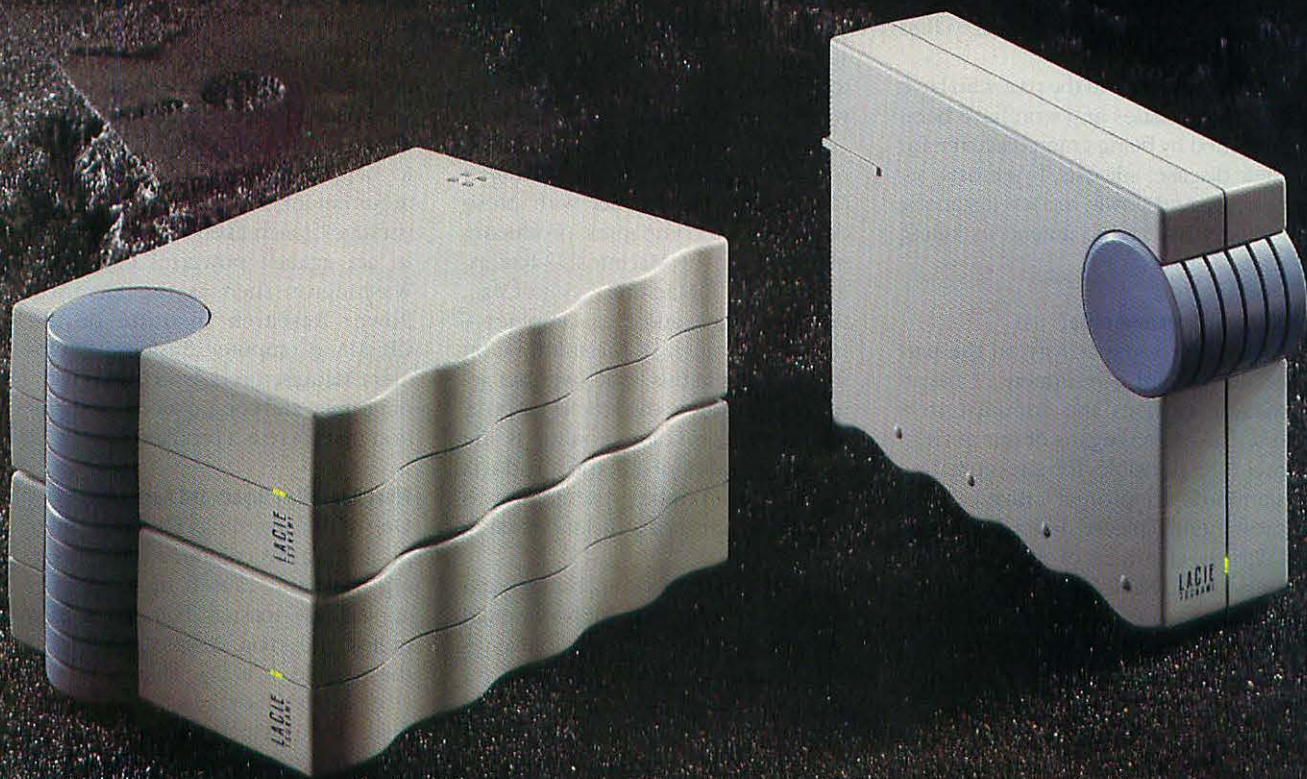
While the impact of VLF emissions has been shown in groups over relatively short periods of time, the effects of ELF—said to be cancers of various sorts—would require longer periods of time to manifest themselves, possibly decades.

Even more troubling, the actual mechanism by which ELF may affect us (I mentioned three suspected impacts: interference with intracellular activities, disturbance of hormonal secretions, and effects upon the immunologic system) is not understood. And without conclusive evidence, it's all too easy to ignore the body of still-evolving research on the subject and say, So prove it.

I am reminded of the soldiers that the military marched into the atomic explosion areas in the 1950s by way of providing them with "psychological training" to improve their fighting prowess in an atomic war theater. Researchers and scientists were certain there would be no health impacts upon the soldiers.



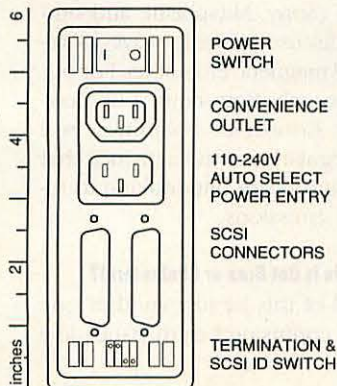
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The scientist or the pathologist looks at the technology and asks, How does ELF cause cancer? The epidemiologist looks at rates of incidence and says, this factor (ELF) is associated with higher incidences of cancer. It is in this interim period of describing the mechanism that we now find ourselves—and the battle lines are drawn between those people looking for the causes and those supported by a very powerful military and industrial coalition that believes that there is no problem and in whose interest it is to find no problem.

Those parties in the past who have raised the issues and won have been rewarded by being granted a name for their disease: silicosis, byssinosis, asbestosis. And slowly, in a few instances, industry has had to amend its killing ways.

#### What Will Government Do?

Hoping for some activity on the part of the federal government, I began making calls to the administrative branch—those organs of our government responsible for promulgating standards to protect citizens. One prominently placed individual, John Villforth, chairman of the Center for Devices and Radiological Health in the FDA, had a press flack respond with a fax that may as well have been written by James Watt to people complaining about tree harvesting on public lands, or by Anne Burford in response to questions about why the Superfund for toxic disasters had not been used to eradicate any problems. It's hard to believe that bureaucrats in Washington have so little real intent to benefit the citizenry of this nation.

On the legislative front I placed calls to the chairmen of the House and Senate Science Committees. Congressman Robert A. Roe, chairman of the House Science Committee, had someone on his staff respond that the congressman did not want to be bothered by nonissues. Only Senator Albert Gore—who held hearings on this subject as a congressman in 1981—agreed to discuss the subject. Fortunately, Senator John Glenn, chairman of the Government Affairs Committee, has decided to hold hearings in May on the subject (he was in the USSR at press time, and unavailable for

months, so was unable to comment).

The result of my dealings with Washington in support of possible immense concerns relating to ELF emissions? Hey, don't bother me. I've got real work to do (a paraphrase of Congressman Roe). *Macworld* will continue to work with the respective congressional staffs to try to bring about legislative activity.

#### How Do the Manufacturers Feel?

While we are fortunate to live in a different age from our grandparents, it is still fair to look at the preceding history of industry and technology so that we may benefit from its lessons.

In an effort to alert manufacturers to the findings of our articles, *Macworld's* editors met with presidents of six companies producing monitors for the Macintosh—Radius, RasterOps, E-Machines, SuperMac, Sigma Designs, and MegaGraphics—to disclose much of the information that appears in this issue (without actually giving them the articles). Apple, whose 13-inch color monitor is the worst offender of all the products tested, agreed to be present, but was unable, because of a misunderstanding, to attend.

We provided a forum, background reading, methodology for how we did our testing. We asked the manufacturers to provide us with feedback for inclusion in this issue. And we told them that the July issue of *Macworld* was part of an ongoing effort to observe how industry would respond to the concerns we are raising. Two companies, MegaGraphics and Sigma Designs, responded that they intend to modify their products so as to ameliorate VLF emissions. Another, SuperMac Technology, has decided to host a larger-scope meeting of the industry with the monitor-tube manufacturers (Sony, Mitsubishi, and others) to discuss possible ways to reduce ELF magnetic emissions. For our part, Deborah Branscum, our *Conspicuous Consumer* columnist, will report regularly on the activities that manufacturers are undertaking to reduce ELF emissions.

#### So What? Is It Oat Bran or Cholesterol?

Could all of this be just another one of those confusing health issues like

the question of the real value of oat bran in one's diet? The merit of which seems to vary with the particular scientist or nutritionist talking about the situation.

Could this be a health issue like cholesterol, which most scientists appear to agree can cause problems, but about which some researchers are now beginning to say that a complete absence is a problem as well?

I think not. Extremely-low-frequency magnetic emissions may prove to be one of the most troublesome issues we face with information technology over the next decade, unless standards are established by the government—something that is unlikely to happen without a congressional requirement. We believe that administrative-branch agencies are unlikely to act against powerful lobbies in Washington such as the Electrical Power Research Institute or the CBEMA (Computer Business Equipment Manufacturers Association) without public and congressional recognition that there is a problem.

#### What About Hair Dryers and Appliances?

One of the first things I'll receive after publishing this column are letters citing the harm caused by household appliances—toasters, hair dryers, ham radios, and so on. Please save yourself the trouble. It is true that those devices also produce the electromagnetic fields about which we are writing—the difference lies in the simple fact that almost none of you spend as much as half of your day sitting next to one of those devices. Unlike any other electrical device that may produce harmful electromagnetic fields, personal computers and their users are closely united for long periods each day. I hate to think of the 12-hour days I've spent on computers over the last several years.

In the end, if we prove to have jumped to a conclusion that's wrong—at least people won't have suffered. But if we're right, and if manufacturers take action, many of the millions of computer users may never have to fear the technology that they've come to rely upon. And manufacturers can focus on advancing technology, rather than on defending themselves from class-action suits. ■



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Quantum	40	15	529	579	799	5
	50	15	599	659	899	5
	80	15	799	859	1099	5
	105	15	899	959	1199	5
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	170	15	1199	1259	1599	5
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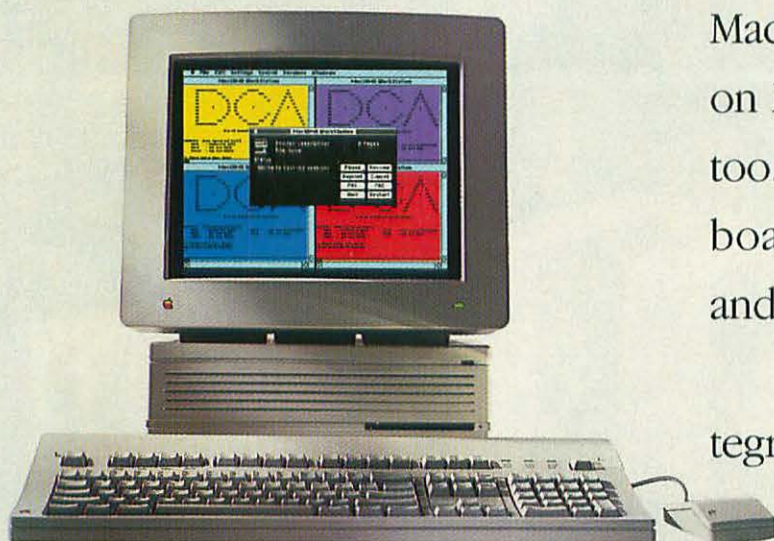
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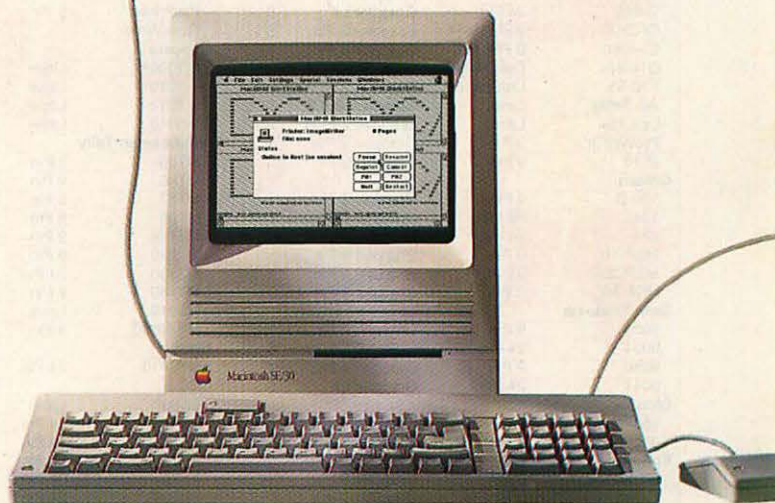
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Allegro	24 Pin	Grappler LX	6
ASP 1000	9 Pin	Grappler 9 Pin	1
P2000+	18 Pin	Grappler 9 Pin	1
P2100	18 Pin	Grappler 9 Pin	1
P2400	18 Pin	Grappler 9 Pin	1
<b>AT&amp;T</b>			
AT&T 450	Daisywheel	None	
470 - 476	9 Pin	Grappler 9 Pin	5
478	9 Pin	Grappler 9 Pin	5
479	9 Pin	Grappler 9 Pin	5
495	Laser	Grappler LX/LS	9
<b>Blaser</b>			
Star 2	Laser	Grappler LX/LS	9
<b>Brother</b>			
1109	9 Pin	Grappler 9 Pin	2,11
1209	9 Pin	Grappler 9 Pin	1
1509	9 Pin	Grappler 9 Pin	1
1709	9 Pin	Grappler 9 Pin	1
1724	24 Pin	Grappler LX	6
HL-8	Laser	Grappler LX	9
HR Series	Daisywheel	None	
M-2518	18 Pin	Grappler 9 Pin	1
M-4018	18 Pin	Grappler 9 Pin	1
TwinWriter	9 Pin	Grappler 9 Pin	1
<b>Canon</b>			
A-60		None	
<b>Centronics</b>			
PS210	9 Pin	Grappler 9 Pin	1
PS220	9 Pin	Grappler 9 Pin	1
<b>C. Itoh</b>			
1550S+NLQ	9 Pin	None	
C-210	9 Pin	Grappler 9 Pin	1
C-215	9 Pin	Grappler 9 Pin	1
C-310	9 Pin	Grappler 9 Pin	1
C-315	9 Pin	Grappler 9 Pin	1
C-715	24 Pin	Grappler LX	7
C-815	24 Pin	Grappler LX	8
CI-2500	9 Pin	Grappler 9 Pin	5
CI-4000	9 Pin	Grappler 9 Pin	1
D10-40	Daisywheel	None	
F10-55	Daisywheel	None	
Jet-Setter	Laser	Grappler LX/LS	9
Lips 10+	Laser	Grappler LX/LS	9
ProWriter Jr.+	9 Pin	Grappler 9 Pin	1
8510	9 Pin	Grappler 9 Pin	
<b>Citizen</b>			
120-D	9 Pin	Grappler 9 Pin	4
124	24 Pin	Grappler LX	7
224	24 Pin	Grappler LX	7
MSP-10	9 Pin	Grappler 9 Pin	1
MSP-15E	9 Pin	Grappler 9 Pin	1
MSP-50	9 Pin	Grappler 9 Pin	1
<b>Data Products</b>			
9030	9 Pin	Grappler 9 Pin	1
9034	24 Pin	Grappler LX	6
9040	9 Pin	Grappler 9 Pin	1
9044	24 Pin	Grappler LX	6
<b>Diconix</b>			
150	12 Pin	None	
300W	9 Pin	Grappler 9 Pin	1
<b>Epson</b>			
EX Series	9 Pin	Grappler 9 Pin	1
FX-80	9 Pin	Grappler 9 Pin	1
FX-80+	9 Pin	Grappler 9 Pin	1
FX-85	9 Pin	Grappler 9 Pin	1
FX-86E	9 Pin	Grappler 9 Pin	3,11
FX-100	9 Pin	Grappler 9 Pin	1
FX-100+	9 Pin	Grappler 9 Pin	1
FX-185	9 Pin	Grappler 9 Pin	3,11
FX-286	9 Pin	Grappler 9 Pin	3,11
FX-286E	9 Pin	Grappler 9 Pin	3,11
JX Series	9 Pin	Grappler 9 Pin	1
Q3500	Laser	Grappler LX/LS	9
LQ500	24 Pin	Grappler LX	
LQ800	24 Pin	Grappler LX	
LQ850	24 Pin	Grappler LX	
LQ1000	24 Pin	Grappler LX	
LQ1050	24 Pin	Grappler LX	
LQ2400	24 Pin	Grappler LX	
LQ2500	24 Pin	Grappler LX	
LX800	9 Pin	Grappler 9 Pin	11
MX800	9 Pin	Grappler 9 Pin	11

Model	Type	Grappler	Notes
<b>Facit</b>			
4509	9 Pin	Grappler 9 Pin	3,11
4510	9 Pin	Grappler 9 Pin	1
4511	9 Pin	Grappler 9 Pin	1
4513	9 Pin	Grappler 9 Pin	1
4514	9 Pin	Grappler 9 Pin	1
B1100	9 Pin	Grappler 9 Pin	1
B3100	9 Pin	Grappler 9 Pin	1
B3150	9 Pin	Grappler 9 Pin	1
B3450	24 Pin	Grappler LX	6
C5500	9 Pin	Grappler 9 Pin	1
C6510	9 Pin	Grappler 9 Pin	1
C6520	9 Pin	Grappler 9 Pin	1
C7400	9 Pin	Grappler 9 Pin	1
C7500	9 Pin	Grappler 9 Pin	1
P7080A	Laser	Grappler LX/LS	9
<b>Fujitsu</b>			
DL2400	9 Pin	Grappler 9 Pin	
DL2600	24 Pin	None	
DL3000 Series	24 Pin	None	
DL4400	24 Pin	Grappler LX	6
DL5600	24 Pin	None	
DX2100	9 Pin	Grappler 9 Pin	1
DX2200	9 Pin	Grappler 9 Pin	1
DX2300	9 Pin	Grappler 9 Pin	1
DX2400	9 Pin	Grappler 9 Pin	1
RX7300	Laser	Grappler LX/LS	9
<b>Genicom</b>			
1025	9 Pin	Grappler 9 Pin	1
5010	Laser	Grappler LX/LS	9
<b>Hewlett Packard</b>			
DeskJet	Inkjet	Grappler LX/LS	9
DeskJet Plus	Inkjet	Grappler LX/LS	9
LaserJet	Laser	None	
LaserJet II	Laser	Grappler LX/LS	
LaserJet IIP	Laser	Grappler LX/LS	
PaintJet	Inkjet	None	
ThinkJet	Inkjet	None	
<b>IBM</b>			
ProPrinter	9 Pin	Grappler 9 Pin	
QuietWriter		None	
<b>Kyocera</b>			
F-1000A	Laser	Grappler LX/LS	9
F-1010	Laser	Grappler LX/LS	9
F-2010	Laser	Grappler LX/LS	9
F-3010	Laser	Grappler LX/LS	9
<b>Mannesman Tally</b>			
MT85	9 Pin	Grappler 9 Pin	1
MT86	9 Pin	Grappler 9 Pin	1
MT87	9 Pin	Grappler 9 Pin	1
MT88	9 Pin	Grappler 9 Pin	1
MT165	9 Pin	None	
MT290	9 Pin	Grappler 9 Pin	1
MT330	24 Pin	Grappler LX	6
MT460	9 Pin	Grappler 9 Pin	1
MT910	Laser	Grappler LX/LS	9
MT-SP80	9 Pin	Grappler 9 Pin	
<b>Nissho</b>			
NP2410	24 Pin	Grappler LX	6
<b>NEC</b>			
LC860	Laser	Grappler LX	9
P5XL	24 Pin	Grappler LX	6
P6	24 Pin	Grappler LX	6
P7	24 Pin	Grappler LX	6
P9XL	24 Pin	Grappler LX	6
P2200	24 Pin	Grappler LX	6
P5200	24 Pin	Grappler LX	6
P5300	24 Pin	Grappler LX	6
PC8023-A	9 Pin	Grappler 9 Pin	
<b>Okidata</b>			
80 Series	9 Pin	None	
90 Series	9 Pin	None	
2410 Series	9 Pin	None	
LaserLine 6	Laser	None	
ML-180	9 Pin	None	
ML-192	9 Pin	Grappler 9 Pin	
ML-192+	9 Pin	Grappler 9 Pin	
ML-193+	9 Pin	Grappler 9 Pin	
ML-292	9 Pin	Grappler 9 Pin	
ML-293	9 Pin	Grappler 9 Pin	
ML-393+	24 Pin	Grappler LX	6
<b>Olympia</b>			
LaserStar6	Laser	Grappler LX/LS	9
NP30	9 Pin	None	1
NP80S	9 Pin	Grappler 9 Pin	1
NP136S	9 Pin	Grappler 9 Pin	1

Model	Type	Grappler	Notes
<b>PCPI</b>			
Lsring 1000	Laser	Grappler LX/LS	9
2000	Laser	Grappler LX/LS	9
3000	Laser	Grappler LX/LS	9
<b>Panasonic</b>			
1080i	9 Pin	Grappler 9 Pin	3,11
1090	9 Pin	Grappler 9 Pin	4,11
1091i	9 Pin	Grappler 9 Pin	3,11
1092i	9 Pin	Grappler 9 Pin	1
1124	24 Pin	Grappler LX	6,11,13
1524	24 Pin	Grappler LX	6,11,13
1592	9 Pin	Grappler 9 Pin	1
1595	9 Pin	Grappler 9 Pin	1
4450	Laser	Grappler LX/LS	9
<b>Ricoh</b>			
PC6000	Laser	Grappler LX/LS	
<b>Seikosha</b>			
BP-5420	9 Pin	Grappler 9 Pin	1
MP-1300AI	9 Pin	None	
SK 3000AI	9 Pin	Grappler 9 Pin	1
SK 3005AI	9 Pin	Grappler 9 Pin	1
SL-80AI	24 Pin	Grappler LX	6
SL-130AI	24 Pin	Grappler LX	6
SP 180	9 Pin	Grappler 9 Pin	1
SP 185AI	9 Pin	Grappler 9 Pin	1
SP1200	9 Pin	Grappler 9 Pin	1
<b>Sharp</b>			
JX-720		None	
JX-9300	Laser	Grappler LX/LS	9
<b>Star Micronics</b>			
Gemini 10X	9 Pin	Grappler 9 Pin	
NB-15	24 Pin	Grappler LX	6
NB24-10	24 Pin	Grappler LX	6
NB24-15	24 Pin	Grappler LX	6
NP-10	9 Pin	Grappler 9 Pin	
NX-10	9 Pin	Grappler 9 Pin	1
NX-100	9 Pin	Grappler 9 Pin	1
NX-1000	9 Pin	Grappler 9 Pin	1
NX2400	24 Pin	Grappler LX	6
SD10	9 Pin	Grappler 9 Pin	
SG	9 Pin	Grappler 9 Pin	
SR	9 Pin	Grappler 9 Pin	
<b>Toshiba</b>			
P321	24 Pin	Grappler LX	12,13
P321SL	24 Pin	Grappler LX	13
P351C	24 Pin	Grappler LX	13
P351SX	24 Pin	Grappler LX	13
PgLsr 12	Laser	Grappler LX/LS	9

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#### Key to Notes:

1. Epson EX, FX, JX series emulation
2. Epson LX series emulation
3. Epson HX series emulation
4. Epson MX series emulation
5. IBM ProPrinter emulation
6. Epson LQ series emulation
7. Plug in cards emulate LQ-1000
8. Toshiba P351 emulation
9. HP LaserJet Plus emulation
10. HP compatibility option req'd
11. No reverse line feed
12. Parallel extension needed
13. Slow Printing

#### Notice:

This chart represents the best current information, based on testing and data supplied by the printer manufacturers. Printers listed as compatible may still exhibit variations in multiple page alignment, slower print speeds and other minor limitations. Laser printers require a minimum of 1MB of printer RAM.



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# LETTERS

## Geeks of the World, Unite!

I read about this new fantastic *GeekChic* magazine in your latest issue of *Macworld* [April 1990] and I just knew that I had to have it.

It is not easy to become a geek. You have to pass hard initiation rites like debugging 188 assembler at 4:00 a.m., and you will be asked to interface a brand-x printer without a manual to your girlfriend's PC and then it will not print the national characters and she will declare you totally useless and marry an IBM repairman with a German automobile.

But I have never regretted becoming a geek. It has been worth it. It was what my mother always wanted. "You should work with computers," she said. "They are so neat and so incredibly clean."

But the best thing with computers is that you know when they work. I mean, who can tell when an oil painting works? I have painted as a hobby for 15 years—wasted years that could have been used to memorize error codes and chip DIP pinouts. The only good painting that came out of it was Mona Lisa typing on a Macintosh. I tried to paint it in the Louvre but I was attacked by an IBM repairman disguised as a Louvre guard, screaming 370 mnemonics in French. These IBM guys are taking over the world. They are

everywhere keeping good art from being created.

But I say, MacGeeks unite! The revolution is continuing; the next generation is on its way. The blue chip is swaying and crumbling under the sheer force of millions of Macs, pumping through networks all over the world, flashing the hypermedia message of the MacColor, the rainbow technicolor of the nineties!

P.S. When do I get my *GeekChic* T-shirt?

Fredrik Bergquist  
Stockholm, Sweden

## Out of Joint over Jasmine

After reading Tom Negri's hard disk review and his 100 percent accurate description of Jasmine Technology's totally "abysmal" service [Reviews, April 1990], I was angry enough to write about my Jasmine fiasco. In December 1989, I ordered a DirectDrive 40 hard disk from Jasmine af-

ter reading favorable reviews in *Macworld* ["World Class," September 1989].

The salesperson assured me that my hard disk would arrive January 15; it didn't. After making numerous attempts to contact Jasmine's customer service, I was told my hard disk should arrive soon—March 4! I also discovered that my Visa account was charged the day I ordered, which meant Jasmine would have my money for two months before I received my drive.

In mid-February, I tried contacting Jasmine again and received a notice that if I had not received my purchase by March 4, I would get my money back. March 4 arrived and my drive didn't, nor did the refund. Several attempts to contact Jasmine yielded absolutely nothing. Finally, I was told that Jasmine is in Chapter 11! All this time Jasmine was duping cus-



## Corrections

The telephone number for Electric Image, manufacturer of ElectricImage Animation System (Where to Buy, April 1990), is 818/444-1819.

The QMS-PS 810 Turbo laser printer (Reviews, April 1990) uses the single-tray Canon SX engine.

For information on *The Macroscopic* (Where to Buy, April 1990), contact Mike Hamilton, James Mountain Reserve, P.O. Box 1775, Idyllwild, CA 92349, 714/659-3811.

The caption for the photograph of Will Wright on page 51 (The Iconoclast, April 1990) should have credited U.C. Berkeley's Environmental Simulation Laboratory for the miniature city in the background.

Virex, a virus-detection utility (Best-Sellers, May 1990), is made by HJC Software.

The Ven-Tel 2400 Plus modem does not offer MNP error correction or MNP data compression ("Choosing a 2400-bps Modem," May 1990).

tomers into ordering its "award-winning" products, knowing that it wouldn't be able to deliver the goods!

I leave it to Visa to get my money back. But the major unanswered question is, What was *Macworld* (continues)



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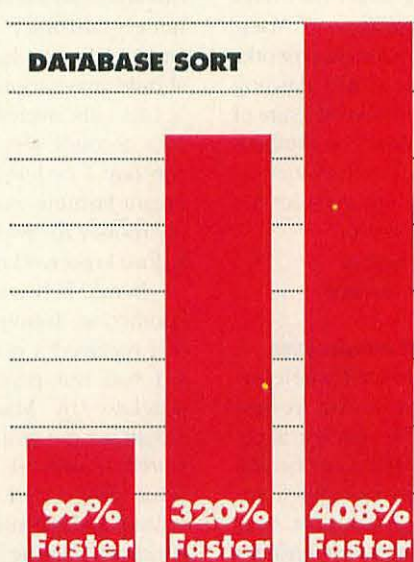


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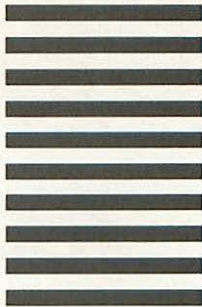
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doing all this time? Were *Macworld's* editors victims of the Jasmine facade that conned the rest of us? Someone must have gotten wind of the impending collapse of Jasmine.

Jennifer Cobb  
Washington, D.C.

When readers began reporting substantial problems with Jasmine's customer service, we started investigating, and as soon as we could confirm Jasmine's financial crisis, we published our findings (see *Conspicuous Consumer*, May 1990). Sources at Jasmine said that its own employees were shocked when the company filed for Chapter 11. We can't accurately predict when a company is about to go bankrupt (in fact, *Macworld* is among Jasmine's creditors). But we do respond to reader complaints, and we publish any information we're able to confirm.

That's why Jasmine's poor service was noted in *Reviews* (April 1990) and in "Midrange Hard Disks" (June 1990).—Ed.

### One Measly Megabyte

Michael Darling complained that he can't run color properly on his Mac IIfx with only one megabyte of memory [*Letters*, April 1990]. Why spend thousands of dollars on such a capable machine, only to limit its power severely by trying to get by on a single megabyte? Hasn't he heard about MultiFinder? Or System 7? Doesn't he know that he can upgrade to 5MB for about \$400? He said that he waited six weeks for SIMM chips from Apple. Since he apparently reads *Macworld*, hasn't he ever noticed the scores of adver-

tisements for SIMMs, most of which offer overnight shipping?

He also said he asked his dealer to order him three additional 1MB SIMMs, apparently laboring under the misconception that he can add them to his present 1MB machine and end up with a total of four. Imagine his disappointment when they finally do arrive and he finds that there is absolutely nothing he can do with three SIMMs until he buys one more!

Chris Johnson  
Warwick, Rhode Island

Don't leave it to your imagination. See the next letter.—Ed.

### SIMM Serendipity

The fact that Apple did not have enough SIMMs to go around proved to be to

my benefit. After having waited six weeks, I undertook the task of finding them myself. I ended up buying four 1MB Toshiba 80ns SIMMs for a little over \$400, as opposed to the three 1MB chips that Apple (and my dealer) tried to sell me for almost \$2000.

Obviously, the price difference is unconscionable, which is why when anybody asks me about the Mac, I always tell them it's a terrific product from a company that couldn't care less about its customers.

Michael Darling  
White Plains, New York

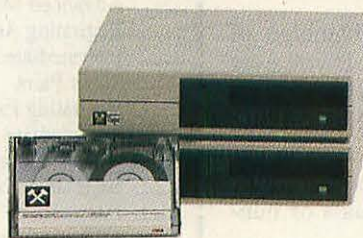
### A Knack for Nits

I write to pick nits. I was tickled to see your use of Japanese on the cover of your April issue, but some-  
(continues)

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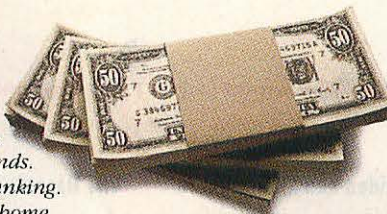
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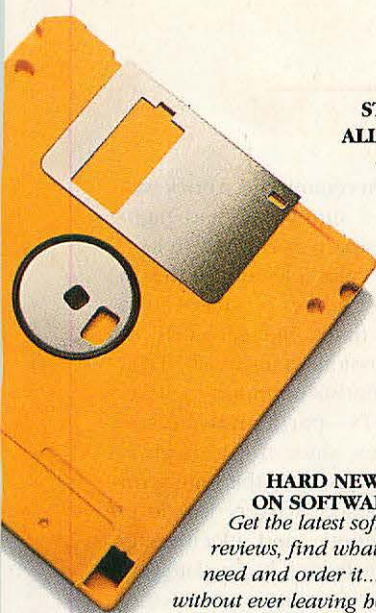
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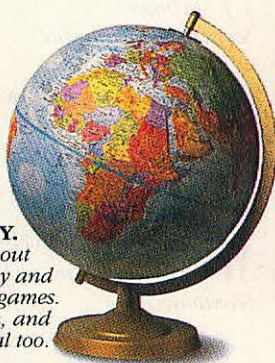


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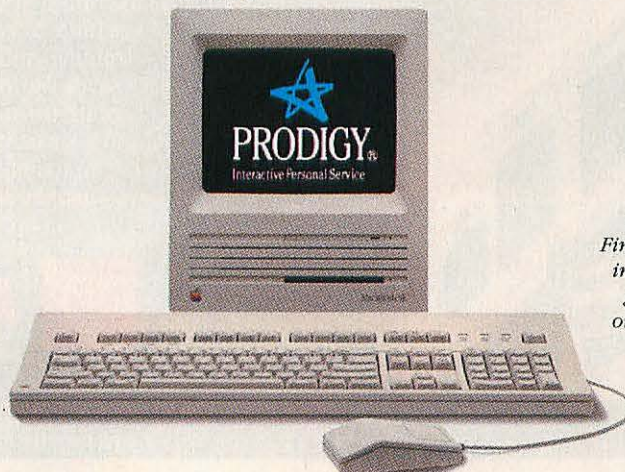
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**Circle 486 on reader service card**





thing immediately struck me as not being quite right. Then I noticed that the fifth character—the one that makes the vowel of the previous character long—was on its side. A tiny nit to pick, I know, but the cover was beautiful and the error, though small, is immediately obvious to anyone who reads Japanese.

Another nit. In Deborah Branscum's description of the process of creating the cover, she mistakenly referred to the Japanese characters as *kanji*. Kanji are the Chinese ideograms used in Japanese. The characters used to spell *Macworld* are phonetic and have no inherent meaning. These phonetic characters, used only by the Japanese, are called *kana*.

Matthew Thorn  
Urbana, Illinois

### Misguided and Shortsighted

**J**oe Dale is as misguided as they come [*Letters*, April 1990]. Anyone who thinks Apple has "lower prices" needs his head examined. Perhaps lower than Cray. As for Apple's "good quality control," where was he during the 128K/Plus power-supply and LQ printer fiascos?

I must disagree strongly with his last line. Apple has indeed "gotten where it has by adhering to shortsighted marketing practices." Even John Sculley has admitted that the downturn in Apple's fortunes is partially due to the short warranty and lack of a low-priced entry machine. That is why the Apple management that was responsible for both is no longer around.

Bruce Pogovin  
Cincinnati, Ohio

### VDT Hazards Disputed

**A**s a degreed ergonomist, I am dismayed by your response to the letter entitled "Harmful Emissions" [*Letters*, April 1990].

To the best of my knowledge, there are no conclusive studies conforming to the rigors of the scientific method that indicate VDTs produce harmful emissions. Several studies, which are anecdotal or have failed to be replicated, have given rise to inflammatory rhetoric and heightened concern among users (for example, Delgado's study of the impact of VLEMR on chick embryos was subsequently refuted by Guy's studies).

True, there are emissions from VDTs. Among them are light, sound, and low-level magnetic fields. There are also emissions

from ceramic tile, a brick wall on a sunny day, and high-tension power lines. In fact, the color television sitting in most homes produces 30 to 50 times higher levels of emissions than most VDTs. Scientists continue to study VDTs—particularly emissions, since not enough is known about the long-term exposure to very low level magnetic and electromagnetic fields—but to date very little conclusive evidence of hazardous emissions exists.

T. J. Springer

Saint Charles, Illinois

For another point of view, see "The Magnetic-Field Menace," in this issue.—Ed.

### This Is Success?

**W**hile I take pride in having chosen to be a Mac—  
(continues)

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# The Power O

**“Talk about gaining an advantage on the competition. With the RasterOps Video ColorBoard 364, I can produce a stock analysis and check out the latest Wall Street report simultaneously on my Macintosh.”**



The promise of multimedia just arrived. And it's from RasterOps.

Introducing the Video Colorboard 364, a single NuBus board that brings the world of full-motion video to your Macintosh.

In short, the Video Colorboard 364 is both a frame grabber and a display board, meaning you can selectively watch live TV or video from any NTSC or S-Video source on a Macintosh screen and capture any image.

Even more amazing, you can run an application program and show video on your Macintosh at the same time . . . without depending on MultiFinder.

If this sounds like a technological breakthrough, you're right. In fact, RasterOps has a patent pending on the circuitry that makes it possible.

Once the video appears on the screen, you can change the channel, brightness, contrast, or sound directly from your Macintosh, thanks to the RasterOps Video Tuner. This companion product also provides a speaker and headphone jack. And a second companion product, the RasterOps Video Expander, enables you to output Macintosh-resident graphics to a video recorder in true 24-bit color.



# f Multimedia.

*"The RasterOps Video ColorBoard 364 is a graphic designer's dream. This single board in my Macintosh lets me capture a 24-bit color image from a video source, then transfer the image into a desktop publishing package."*

For applications that require recording on a video tape, the Video ColorBoard and Video Expander is the perfect solution.

The Video ColorBoard 364 also represents a multimedia building block. RasterOps developed the XCMD software for the Video ColorBoard 364 to interact with applications such as SuperCard, HyperCard, and MacroMind Director. You can create training aids, presentations, and other tools that take advantage of its multimedia capabilities. Regardless of your application, one of the best parts about the Video ColorBoard 364 is its introductory price. At \$1,995, the Video ColorBoard 364 provides an incredible range of features at half the cost of competitive products.

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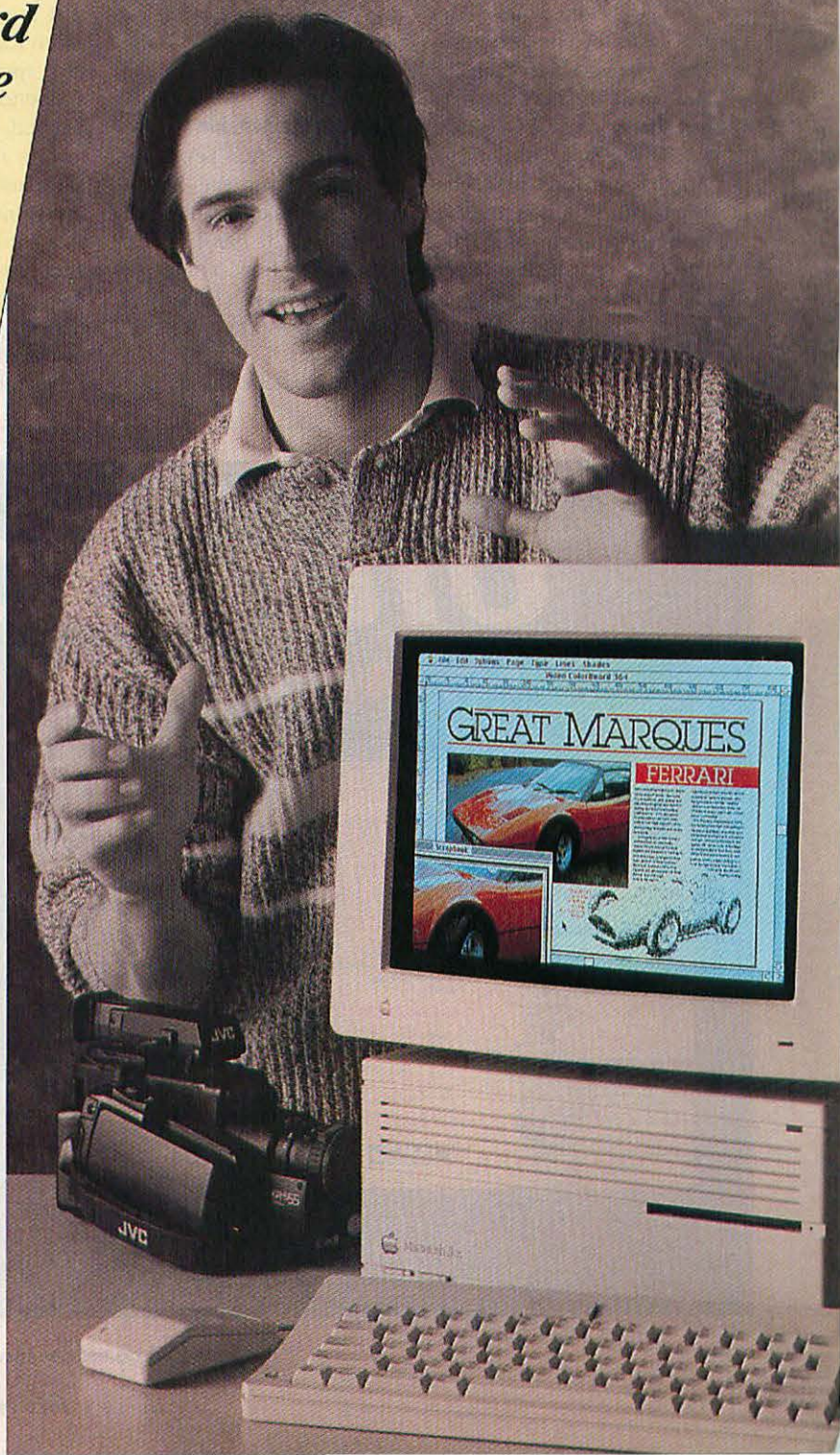
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intosh user, I'm tired of being in the minority and having to defend my position of having deviated from "The Standard." I submit that I would not be in this position if Apple had not committed one of the greatest marketing blunders of the late twentieth century. Apple has succeeded in taking a clearly superior computing standard, and—after more than five years of competition—has managed to achieve less than 20 percent market share.

This is success? For this, Apple rewards its top executives with bonuses and imported company cars? True, the Macintosh has been profitable, but imagine where Apple might be today if it had responded to the needs of users five years

ago, instead of waiting until now to think about developing a low-cost Mac. In an industry where standards are everything, Apple should have realized that market share is more important than gross margin. As PCs get better at emulating the look-and-feel of the Macintosh, Apple is rapidly losing the only thing that differentiates its product from the rest of the world.

David Demuro  
Cary, Illinois

#### Power to the Portable

Reading Steven Levy's column about the Macintosh Portable [*The Iconoclast*, March 1990], I was struck by how completely one person's disadvantages are another person's advantages.


He criticizes the lead-

acid battery. I welcome it because its charge can be topped off at any time, without the memory problems associated with Nicad batteries: if they are charged a few times when not completely drained, they won't take a full charge again. I truly enjoy the freedom of charging the Mac whenever it's convenient.

Another feature I like is that the hard disk shuts off when it's not in use. A hard disk spins at a high speed and tends to develop a high-pitched whine that is annoying and that can eventually damage hearing. I use the Control Panel to make the hard drive shut down after just one minute of non-use. It comes on when needed, runs a bit, and the rest of the time I don't have to hear it.

The display isn't as bright as one that is internally illuminated? Great. Why is it that people complain about the glow of CRT screens on desktops, and then complain if a laptop's screen doesn't glow? The Macintosh Portable has an excellent screen. Reading it does require external illumination, but so does reading a newspaper.

J. A. Coffeen  
Houston, Texas

.....  
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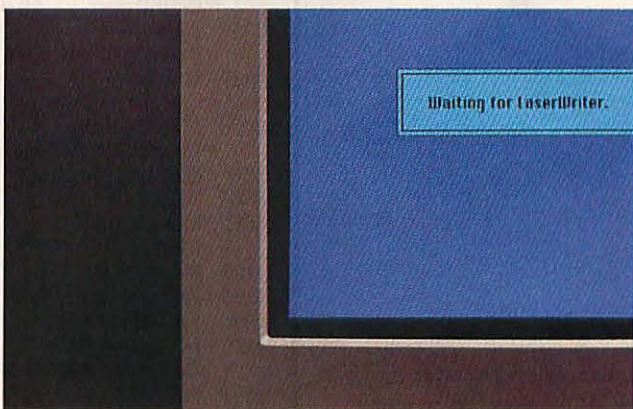
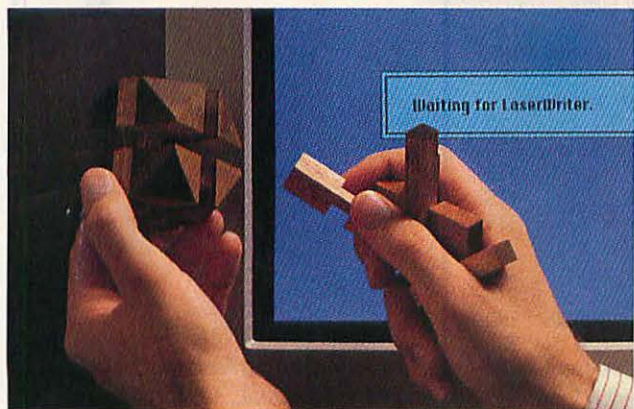
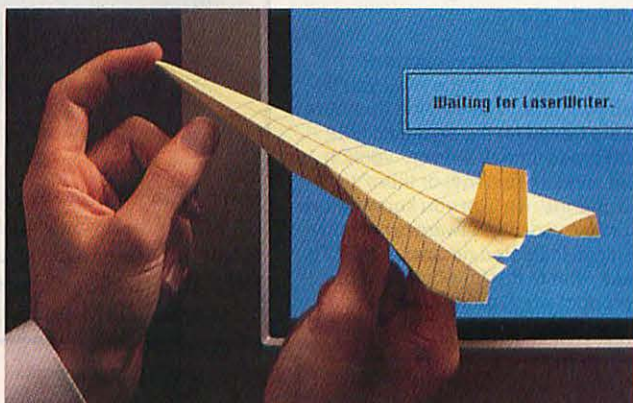
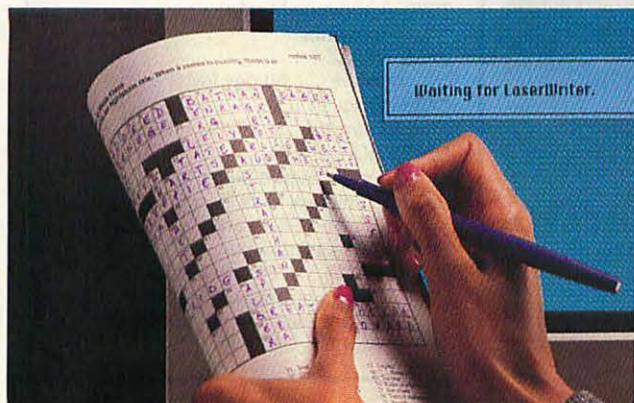


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# Idle Macs Are The Devil's Playground.

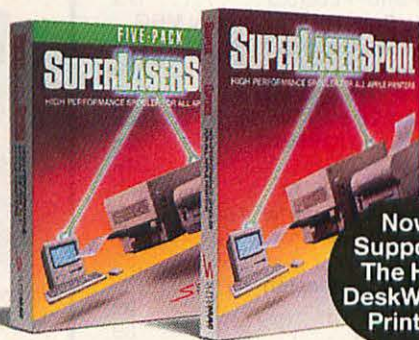


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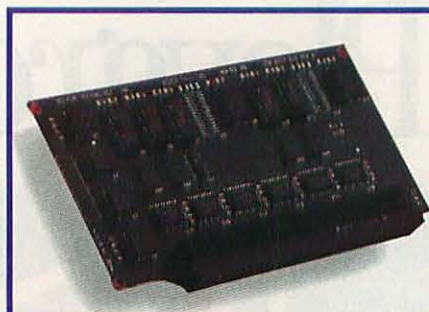
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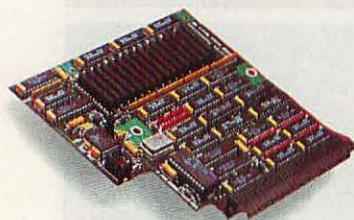
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- 5618 4th Dimension 2.0.10 ..... 465.
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- 1129 MacWrite II 1.1 ..... 145.
- 4196 FileMaker II 1.1V2 ..... 219.
- 5910 FileMaker II & MacWrite II Bundle . 289.
- 1125 MacProject II 2.1 ..... 365.
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- 4844 FoxBASE +/Multi-User 2.0. .... 389.
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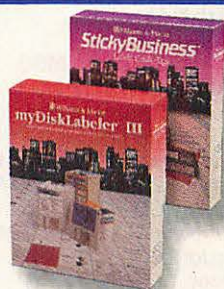


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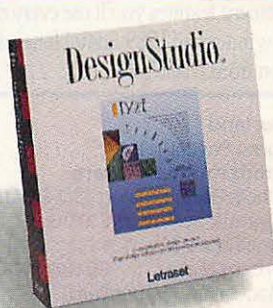
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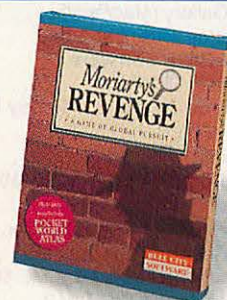
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- 1668 Cricket Graph 1.3.2 ..... 125.  
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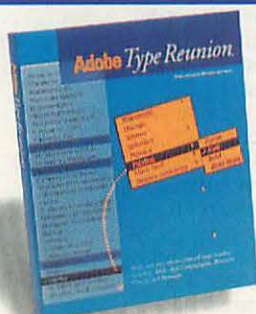
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## Oldival

- 7120 VideoPaint 1.0 ..... 279.

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6931 Adobe Type Set 1 & 2/ATM Pack—Adobe Type Set 1 & Adobe Type Set 2, each containing seven different typefaces, are a perfect match when bundled with ATM to jazz up invitations, announcements, etc. .... \$149.

## ★Timeworks ... 30 day MBG

- 7115 Publish It! Easy 1.1 ..... \$113.  
 5908 Publish It! 1.2 ..... 279.

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- 6900 ClickArt Business Cartoons ..... 32.  
 3633 ClickArt Christian Images ..... 39.  
 5167 EPS Business Art ..... special 69.

## ★Wayzata Tech. ... 60 day MBG

- 6576 Vietnam Remembered (CD-ROM) ... 69.  
 6370 Quick Art (CD-ROM) ..... 175.

## ★Wildflower ... 30 day MBG

- 6512 SnapJot 2.0 ..... 32.

## ★Zedcor ... 60 day MBG

- 3986 DeskPaint & DeskDraw 3.0 ..... 115.

## PROGRAMMING & HYPERMEDIA

### Apple Computer

- 1118 HyperCard 1.2.5 ..... 42.

## ★Beacon Technology ... 30 day MBG

- 6426 Gems of The Word 1.0 ..... 25.  
 4967 HyperBible 1.0 (King James) ... 145.  
 4968 HyperBible 1.0 (New International) 175.



## Aladdin Systems ... 30 day MBG

6169 Shortcut 1.0.2—Enhance every application's open and save dialogs with folder and file management features you'll use every day. A 5 mice winner and 1989 Eddy Honorable Mention from MacUser ..... \$46.

### Borland

- 1511 Turbo Pascal 1.1 ..... 68.

### Broderbund Software

- 5237 Whole Earth Catalog (CD-ROM) ... 89.

## ★Digitalk ... 60 day MBG

- 5166 SmallTalk/V Mac 1.1 ..... 125.

## ★Dream Maker ... 30 day MBG

- 4115 MacGallery (HyperCard) ..... 27.

## ★Foundation Publishing ... 60 day MBG

- 6701 HyperSpeller 1.0 ..... 29.

### Hyperpress Publishing

- 4233 Icon Factory 1.0 ..... 45.

### ICOM Simulations

- 5681 HyperTMON 1.0 ..... 58.  
 4085 TMON 2.8.4 ..... 87.

### Individual Software

- 4719 101 Scripts & Buttons HyperCard 1.0. 35.

## ★Leister Productions ... 30 day MBG

- 7126 Reunion ..... 89.

## ★Manx Software ... 60 day MBG

- 4075 Aztec C + SDB 3.6B ..... 95.

## ★MicroMaps ... 30 day MBG

- 5512 HyperAtlas 1.0 ..... 59.

## ★Microsoft ... 30 day MBG

- 4471 QuickBasic 1.0 ..... 64.



# need of more RAM.



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6948 File Force 1.0—The world's first relational file manager that will have you building and using your own custom-tailored filing system in just a few hours. .... \$249.

## ★Millenium Software ... 30 day MBG

6105 HyperX 3.0. .... 65.

## ★Now Software ... 30 day MBG

6739 Prototyper 2.1. .... 185.

## ★Silicon Beach ... 60 day MBG

5100 SuperCard 1.5. .... 189.

6703 Inside SuperCard (Microsoft Press). .... 17.

## ★Softstream Int'l., Inc. ... 30 day MBG

6513 Authenticate & Mutate. .... 79.

5440 HyperHIT 2.2. .... 125.

## ★Somak Software ... 30 day MBG

5897 ScriptEdit 1.1. .... 49.

## ★Spinnaker ... 30 day MBG

6692 PLUS 1.11. .... 115.

## ★Symantec ... 30 day MBG

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3421 THINK Pascal 3.0. .... 165.



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3420 THINK C 4.0. .... \$165.

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## ★TGS Systems ... 30 day MBG

6667 Prograph 1.2. .... 125.

## ★TML Systems ... 30 day MBG

3549 TML Pascal II 3.1 (w/MPW 3.1). .... 109.

## Trendware

HyperTools #1 or #2. .... each 52.

## True BASIC, Inc.

3587 True BASIC 2.02. .... 55.

## ★Zedcor ... 60 day MBG

3985 ZBasic 5.0. .... 88.

## UTILITIES

## ★Abbott Systems ... 30 day MBG

5236 CanOpener 1.1. .... 63.

## ★Affinity Microsystems ... 60 day MBG

1016 Tempo II 1.02. .... 93.

## ★Aladdin Systems ... 30 day MBG

6169 Shortcut 1.0.2. .... 46.

6740 Stuffit Deluxe 1.0. .... 63.

## ★ASD Software ... 30 day MBG

7085 FileGuard Extended 2.5 (1 user). .... 145.

## ★Berkeley Systems ... 30 day MBG

5737 After Dark 1.1C. .... 22.

1541 Stepping Out II 2.02. .... 49.

## ★Bravo ... 30 day MBG

5404 SPAMM 1.1. .... 48.

## ★Casady & Greene ... 60 day MBG

2269 QuickDEX 1.4A. .... 31.

## ★CE Software ... 60 day MBG

4689 MockPackage Plus Utilities 4.4. .... 31.

1727 CalendarMaker 3.0. .... 31.

6278 DiskTop 4.0. .... 63.

1729 QuickKeys 1.2. .... 63.

## Central Point

5040 Copy II Mac 7.2. .... 23.

5041 Mac Tools Deluxe 1.1. .... 75.

## ★Connectix ... 30 day MBG

6123 Virtual 2.02 (for SE/30, IICx, IICx, & IICx). .... 115.

6122 Virtual 2.02 (for Mac II, incl. PMMU). .... 188.

## ★Dantz Development ... 30 day MBG

5255 Retrospect 1.1. .... 149.

## Dubl-Click Software

6653 MenuFonts 3.0. .... 30.

1824 Calculator Construction Set 2.05. .... 45.

## ★Electronic Arts ... 30 day MBG

1843 Disk Tools Plus 1.01 (Batteries Incl.). .... 31.

## ★Fifth Generation ... 30 day MBG

4287 PYROI 4.0 (screen saver). .... 22.

3954 PowerStation 2.5.2. .... 33.

3955 Suitcase II 1.2.5. .... 43.

5178 FastBack II 2.1. .... 106.

5725 DiskLock 1.0. .... 106.

## ★HJC/Microcom ... 30 day MBG

4803 Virex (latest version). .... 52.

5885 Virex (10 Pack). .... 329.

## ICOM Simulations

4084 On Cue 1.3. .... 35.

## ★Insight Development ... 30 day MBG

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3422 More 3.0—The fastest way to organize and present your ideas. Brings together outlining, presentations, word processing, and charting to create the most powerful business communications tool on the Macintosh. \$265.

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6088 Smart Alarms 3.02 (1-4 users). .... 99.

6087 Smart Alarms (5-8 users). .... 149.

6086 Smart Alarms 3.02 (9-15 users). .... 199.

## ★Kent Marsh Ltd. ... 30 day MBG

5457 QuickLock 1.0. .... 56.

2591 The NightWatch 1.03. .... 85.

6134 MacSafe II. .... 107.

## ★Kiwi Software ... 60 day MBG

6267 KiwiEnvelopes! 3.0. .... 34.

## ★Loop Software ... 30 day MBG

5442 PictureBook 3.2. .... 39.

## ★Microlytics ... 60 day MBG

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## ★Microseeds Pub. ... 60 day MBG

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2913	Redux 1.6.	49.
7116	Rival 1.1	49.

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6924	Screen Locker 1.0.	45.
6925	Now Utilities 1.0	89.

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4503	MultiClip 2.0	49.
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## ★ON Technology ... 1 year MBG

6385	On Location 1.0	75.
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## ★Peter Norton ... 30 day MBG

6748	Norton Utilities for the Mac	84.
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## ★Software Innovations ... 30 day MBG

5869	HandOff 1.1	31.
6647	HandOff II.	52.

## ★Solutions, Inc. ... 60 day MBG

3448	SmartScrap & The Clipper 2.1	45.
3449	SuperGlue II 2.01	61.

## ★SuperMac Tech. ... 60 day MBG

3383	SuperSpool 5.0	58.
3382	SuperLaserSpool 2.02	87.
3378	SuperLaserSpool 5-Pack 2.02	289.
3377	DiskFit 1.5	58.
3379	Network DiskFit 1.5.	225.

## ★Symantec ... 30 day MBG

5176	Symantec AntiVirus for Mac (S.A.M.)	67.
5724	Symantec Utilities for Mac (S.U.M.)	99.



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7147	MacEnvelope 5.0	57.
6666	MacEnvelope Plus 2.0	159.

## ★Williams & Macias ... 30 day MBG

6926	myDiskLabeler III 3.0	49.
3780	ImageWriter II Label Pack (Qty. 216)	15.
3781	LaserWriter Label Pack (Qty. 216)	18.
4976	StickyBusiness 1.2	89.
6927	StickyBusiness Plus 1.2	149.

## XTree

5177	XTreeMac 1.02	50.
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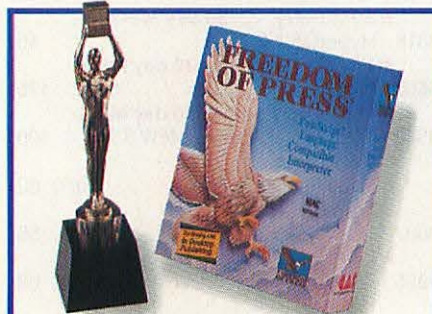
## LEARN & PLAY

### Access Software

4655	World Class Leader Board Golf	25.
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### Accolade

1184	Hardball (CP)	26.
4484	Mean 18 (CP)	26.
6760	Test Drive II-The Duel	31.



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6517 Freedom of Press 2.1A—1989 MacUser Editors' Choice Awards for Software Product Of The Year and Best Graphics/Publishing Utility. Brings PostScript-printing capabilities to non-PostScript output devices ..... \$255.

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4486	Manhole	28.
5127	Manhole (CD-ROM)	34.
5517	Cosmic Osmo	40.

## ★Ars Nova ... 30 day MBG

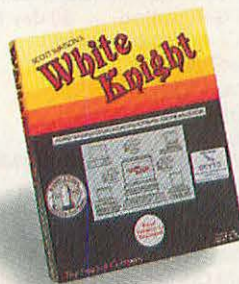
1215	Practica Musica 2.2	69.
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## ★Bogas Productions ... 60 day MBG

4255	Super Studio Session 2.0	65.
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## Broderbund Software

4314	Type! 1.0	18.
5886	Star Wars (CP)	23.
4099	Shufflepuck Cafe (CP)	23.
1421	Ancient Art of War (CP)	26.
4540	Ancient Art of War at Sea (CP)	26.
6516	The Playroom (CP)	29.
4229	Where/World Carmen Sandiego? (CP)	29.
5755	Where/Europe Carmen Sandiego?(CP)	29.
5233	Where/USA Carmen Sandiego? (CP)	29.
6384	PlayMaker Football (CP)	29.
4966	SimCity 1.1	29.
5871	SimCity Supreme	47.
6515	SimCity Terrain Editor	16.
1422	Geometry 1.2 (CP)	58.
4067	Calculus 1.2 (CP)	58.
1426	Physics 1.2 (CP)	58.



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5841	Moriarty's Revenge (CP)	\$32.
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## Bullseye

1544	Ferrari Grand Prix (CP)	31.
4074	P51 Mustang Flight Simulator (CP)	31.

## Carina Software

5726	Voyager 1.2	89.
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## ★Casady & Greene ... 60 day MBG

2268	Crystal Quest 2.2T	25.
4119	Crystal Quest w/Critter Editor 2.2T	39.

## Coda Music Systems

5854	MusicProse 1.0	187.
5604	Finale 2.0	559.

## Davidson & Associates

1734	Math Blaster! 1.0 (CP)	26.
6128	Math Blaster Mystery (CP)	26.

## ★Electronic Arts ... 30 day MBG

6297	Halls of Montezuma	26.
6716	Pipe Dreams	17.
6663	Sands of Fire	29.
5554	Bard's Tale	32.
4064	Chuck Yeager Flight Simulator	32.
6594	Starflight	39.
1846	Deluxe Music Construction Set 2.5	84.



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5294	Puzzle Storybook 1.0 (ages 3-8)	27.
5293	Dinosaur Discovery Kit 1.0 (ages 3-8)	27.

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2276	KidsTime 1.2 (ages 3-8)	26.
5642	KidsMath 1.1 (ages 3-8)	26.
4334	NumberMaze 1.1 (ages 5-12)	26.
2270	American Discovery 2.3 (ages 9 +)	26.
2273	ConcertWare+ 4.0	38.
2271	ConcertWare+ MIDI 5.0	98.

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Word Torture - Beginner to Advanced (Span., Fren., Germ., Ital. & Rus.) ea.			29.
Pronunciation Tutor - Beginner (Spanish, French, German)			ea. 35.
Verb Tutor - Intermediate (Spanish, French, German)			ea. 42.
6604	Verbal Aspect - Inter. (Russian)		42.
6611	Kanjimaster - Beg. (Japanese)		105.

## ★Inline Design ... 30 day MBG

5870	Bomber 1.3 (includes headphones)	26.
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5453	Talking Math Rabbit 1.0 (ages 4-7)	30.



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## Miles Computing

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2765 Fool's Errand ..... 32.

## Mindscape

4083 Balance of Power 1990 (CP) ..... 29.

3987 Colony (CP) ..... 29.

4596 Deja Vu II (CP) ..... 29.

2743 Crossword Magic (CP) ..... 29.

## ★Penton Overseas ... 30 day MBG

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Russian, and Level I Hebrew) . . . ea. 29.

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5274 M4 Word Processing . . . 36.

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5259 A1 Beginning Illustrator . . . 36.

*Personal Training for FileMaker*

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5279 FM2 Intermediate FileMaker . . . 36.

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6353 FH1 Beginning Level . . . 36.

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6466 Citadel . . . 27.

**Premier Technology**

5773 Strategic Conquest Plus 2.0 . . . 34.

5774 NetTrek—The Real Version 2.3 . . . 34.

**Sierra On-Line**

3397 Leisure Suit Larry (CP) . . . 23.

5694 Manhunter: San Francisco (CP) . . . 28.

5458 Manhunter: New York (CP) . . . 28.

3394 King's Quest (CP) . . . 28.

3398 Police Quest (CP) . . . 28.

3400 Space Quest II (CP) . . . 28.

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4995 Cribbage Tutor . . . 26.

6258 MacRummy . . . 32.

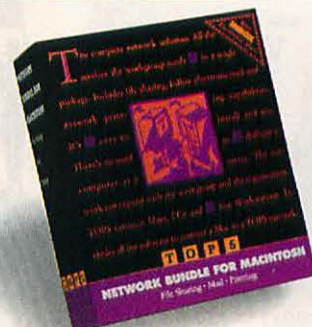
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6112 Welltris (for Mac II & SE) . . . 19.

3459 Falcon 2.2 . . . 30.

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2329 SAT Score Improvement 1.0 (CP) . . 57.

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3571 Algebra (with workbook) . . . 45.

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## ★Wayzata Tech. ... 60 day MBG

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- 6038 Road Racer (CP) . . . . . 38.
- 6040 MacGolf Classic (CP) . . . . . 52.

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### ★CE Software ... 60 day MBG

- 5174 QuickMail 2.2 (5 user Pak) . . . . . 215.
- 5173 QuickMail 2.2 (10 user Pak) . . . . . 315.

### ★CompuServe ... 60 day MBG

- 1676 CompuServe Information Service . . . 23.
- 1673 CompuServe Navigator 3.0 . . . . . 49.
- 1674 Standard Service/Navigator Bundle . . 69.

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- 5834 Connect 1.5 for the Macintosh . . . . 63.

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- 4842 MacLink Plus/Translators 4.12 . . . . 99.

### ★Dove Computer ... 60 day MBG

- 6758 DoveFax Desktop . . . . . 279.
- 4939 FastNet III . . . . . 375.
- 4938 FastNet SE . . . . . 375.
- 5624 FastNet SE/30 . . . . . 375.

### ★Dow Jones ... 30 day MBG

- 5295 News/Retrieval Membership Package . 24.

### ★Farallon Computing ... 30 day MBG

- 5707 Timbuktu 3.1 . . . . . 95.
- 4866 Timbuktu/Remote 1.0.1 . . . . . 123.
- 6371 Timbuktu/Remote Access Pack . . . 849.
- 5664 PhoneNET StarConnector . . . . . 19.
- 6273 PhoneNET StarConnector 10-Pack . . 129.
- 2203 PhoneNET Connector (DIN-8) . . . . 31.
- 4869 PhoneNET Connector 10-Pk (DIN-8) . 198.
- 4868 PhoneNET Repeater . . . . . 315.
- 2206 PhoneNET StarController 300 . . . . 825.
- 6687 PhoneNET StarController-EN . . . . 1599.
- 5893 Portable Pack (incl. two copies each of Timbuktu & Timbuktu Remote, two StarConnectors, and accessories) . . 329.
- 6778 Remote/Wakeup Cable . . . . . 33.
- 6766 MediaTracks . . . . . 189.
- 6767 MediaTracks Multimedia CD Pack . . 319.
- 6768 MediaTracks Multimedia Pack . . . . 319.

### ★Freesoft ... 60 day MBG

- 6115 White Knight 11.4 . . . . . 85.

## Hayes

- 2300 Smartcom II 3.1C . . . . . \$84.
- 2307 Smartmodem 2400 . . . . . 349.
- 6654 V2400 Internal Modem w/software . call
- 6655 V2400 Baud Modem . . . . . 459.
- 5991 V9600 Baud Modem . . . . . 759.

## Insignia Solutions

- 7058 SoftPC-AT/EGA Module . . . . . 125.
- 4089 SoftPC 1.3 . . . . . 245.
- 6688 SoftPC for the Mac Portable . . . . 245.

## Intel Corporation

- 6265 2400EX with QuickLink II . . . . . 195.
- 6650 2400EX MNP with QuickLink II . . 249.

### ★Microsoft ... 30 day MBG

- 5858 Microsoft Mail 2.0 Workstation . . . . 83.
- 5856 Microsoft Mail 2.0 Server . . . . . 245.
- 5857 Microsoft Mail 2.0 (20 pack) . . . . 965.

### ★Nuvotech ... 60 day MBG

- 3000 TurboNet ST (DIN-8) . . . . . 30.
- 6751 TurboNet ST (12-Pack) . . . . . 279.
- 5277 TurboBridge . . . . . 319.
- 6272 NuvoLink SC . . . . . 319.
- 6750 NuvoLink II . . . . . 279.
- 6261 TurboStar . . . . . call



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## Orchid Technology

- 6949 OrchidFAX Modem . . . . . 459.

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- 5285 PM 2400SA MNP Modem . . . . . 209.
- 3089 Mac Communications Pack 1.5 . . . 225.

### ★Shiva ... 30 day MBG

- 3444 NetSerial X232 . . . . . 275.
- 4347 NetBridge . . . . . 339.
- 4942 TeleBridge . . . . . 339.
- 3443 NetModem V2400 . . . . . 435.
- 6917 NetModem V32 . . . . . 1429.
- 6519 EtherGate . . . . . 1629.

### ★Software Ventures ... 30 day MBG

- 3455 MicroPhone II 3.0 . . . . . 215.

### ★Solutions, Inc. ... 60 day MBG

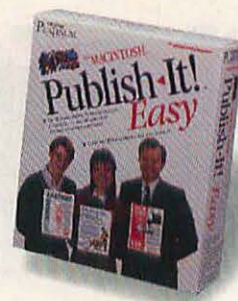
- 6721 MailMaker 5 User Pack . . . . . 117.
- 4308 BackFAX (reqs. Apple FAX modem) . 124.
- 6720 FAXGATE Plus . . . . . 239.

### ★Synergy ... 30 day MBG

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- 6619 VersaTerm-PRO 3.1.1 . . . . . 174.

### ★TOPS ... 30 day MBG

- 4188 TOPS Teleconnector (DIN8) . . . . . 25.



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7115 *Publish-It! Easy 1.1*—Combines the sophistication of Publish-It! with an innovative, new, easier user interface. Even newcomers can produce powerful, dynamic documents. . . \$113.

- 4598 TOPS FlashBox . . . . . 118.
- 3720 TOPS Flashcard . . . . . 155.
- 7057 MacPrint TOPS Network Version 1.0 . 165.
- 6264 TOPS Networking Bundle 3.0 . . . . 187.

### ★Travelling Software ... 60 day MBG

- 3729 LapLink Mac III Connectivity Pac. . . 119.
- 6741 LapLink Mac III Network Pac. . . . 185.

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### ★American Power ... 30 day MBG

- 5895 UPS 110SE . . . . . 209.
- 6686 UPS 370ci . . . . . 339.

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- 6719 Apple Portrait Display . . . . . 899.

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- 3943 DC2000 40 MB Data Cartridge. .... 20.

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- 6592 44 Meg. Removable Cartridge ..... 85.

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1114 LaserWriter Plus Toner Cartridge. .... 99.  
1115 LaserWriter II Toner Cartridge ..... 105.

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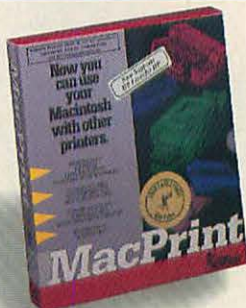
- 2267 The Macintosh Bible (2nd Edition) . . 19.

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2381 MacLuggage Macinware SE. .... 75.  
6129 The Ultimate SE/Ext. Carrying Case 79.

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4643 Mac II Stand and Cable Kit ..... 64.  
6895 Mac IIcx Monitor Stand ..... 54.  
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2578 Extra Long ADB Keyboard Cable . . 24.  
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4972 Power Tree 10 ..... 19.  
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3261 ImageWriter II Ribbon Multi-4-Color . 9.  
3270 ImageWriter II Rainbow 6-Pack. .... 20.  
3260 ImageWriter LQ Black Ribbon. .... 17.

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4014 High Trek Mac SE & Ext. Kybd. Case. 69.  
5839 Mac IIcx CPU & Kybd. Carry Case . 69.  
4862 SE Protection Pak (ext. keyboard) .. 75.

### ★Targus ... 60 day MBG

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6151 JetLink Express 1.1 ..... 89.  
6257 JetLink/Expressive Fonts Bundle. . 159.

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6689 HP DeskWriter & ATM Bundle. . 889.

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2547 Turbo Mouse ADB 3.0. .... 109.

## Koala

2593 MacVision 2.1 ..... 219.

## Kodak

6730 DICONIX M150 Plus Printer ..... 489.

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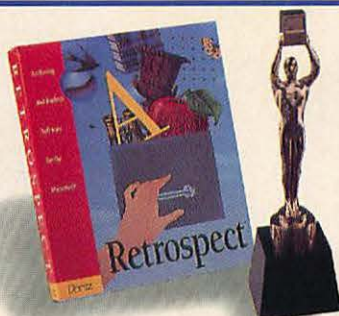
6126 Mobius Cordless Mouse. .... 95.

### ★Mouse Systems ... 30 day MBG

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### ★Nutmeg Systems ... 30 day MBG

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3034 Read-It! OCR 2.1 ..... 245.

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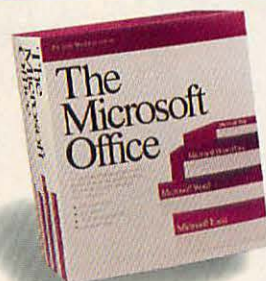
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6725 MaraThon 030 for Mac II. .... 449.  
6724 MaraThon 030 for SE ..... 449.  
6723 MaraThon 030 for Plus ..... 449.  
1809 MacSnap 524S. .... 239.  
1812 MacSnap 548S. .... 479.  
1804 MacSnap 2S. .... 189.  
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5632 Drive 2.4 (includes FastBack II) . 325.

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7149 Xceed IIci-128 Cache Card. .... 589.

## NEC

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6743 Mac Driver Kit. .... 64.

### ★SuperMac Tech. ... 30 day MBG

5447 Dataframe XP 30 Hard Drive. .... 599.  
5448 Dataframe XP 60 Hard Drive. .... 799.  
5449 Dataframe XP 100 Hard Drive. . 1049.  
5450 Dataframe XP 150 Hard Drive. . 1399.  
5451 Dataframe XP 330 Hard Drive. . 2369.

## Toshiba

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6659 QD2000 40 MB Data Cartridge. . 19.



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# ART BEAT

by Deborah Branscum

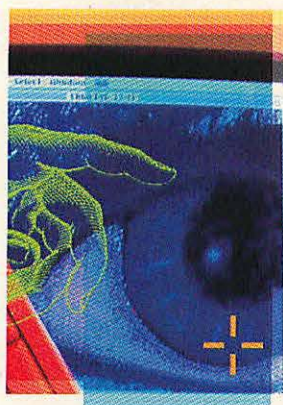
The tools and talent behind Macworld's graphics and the techniques that make them possible

**Artist:** French illustrator Erik Adigard studied fine arts in France and later attended the California College of Arts and Crafts. Currently he is part of San Francisco graphic design company M.A.D.

**Tools:** Macintosh II with 8MB of RAM, a SyQuest external 45MB tape drive, Barneyscan slide scanner, Microtek 300 scanner, Electronic Arts' Studio/8, and Adobe Photoshop.

**How It Was Done:** For the opening art of *Conspicuous Consumer* on page 71, Adigard created an image of an eye in Studio/8, and called up the image on his monitor. He photographed the keyboard and the display together in a rough composition. The artist used the Barneyscan scanner to scan in the resulting 35mm transparency and imported the image into Photoshop, where he worked on the keyboard and display images separately.

For much of the work he used the magic wand from Photoshop's Toolbox. The project took more than eight hours. "It took time to make the keyboard very three-dimensional and very sculptural—and to make the screen look a little bit menacing," Adigard ex-

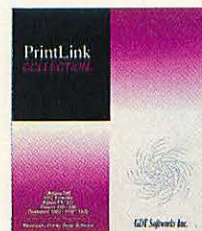
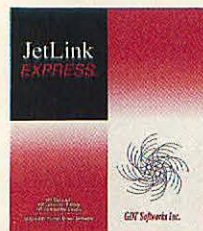


plains. The artist added a symbol under the pupil. The targetlike icon appears to threaten the eye, alluding to the article's discussion of ergonomic issues for computer users.

For the keyboard he wanted a warm glow, "almost a hot feeling." In stark contrast he wanted a very cool blue screen image. "Once the inherent qualities of each element had been reinforced—warmth and modeling for the keyboard, saturation and brightness for the screen—I juxtaposed them again and finalized alignment and cropping." He also added rectangles of color on top of the image.

In the last step, the artist scanned in a copy of an engraving of a hand. In Photoshop he eliminated all the unwanted details of the original image, then enlarged the fine lines "by blurring them and then by building up the contrast so that all middle tones turned into a single solid line. ■

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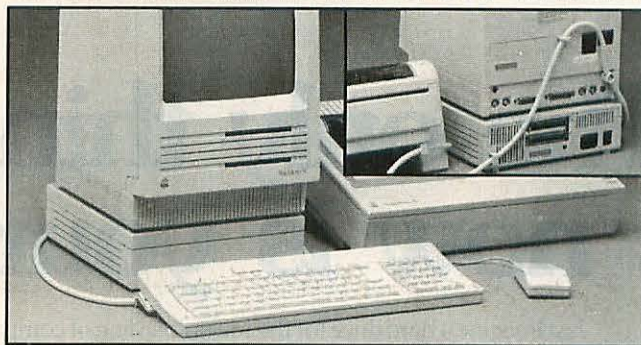
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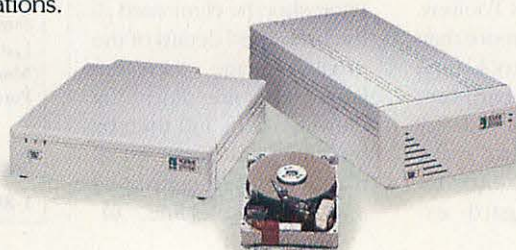


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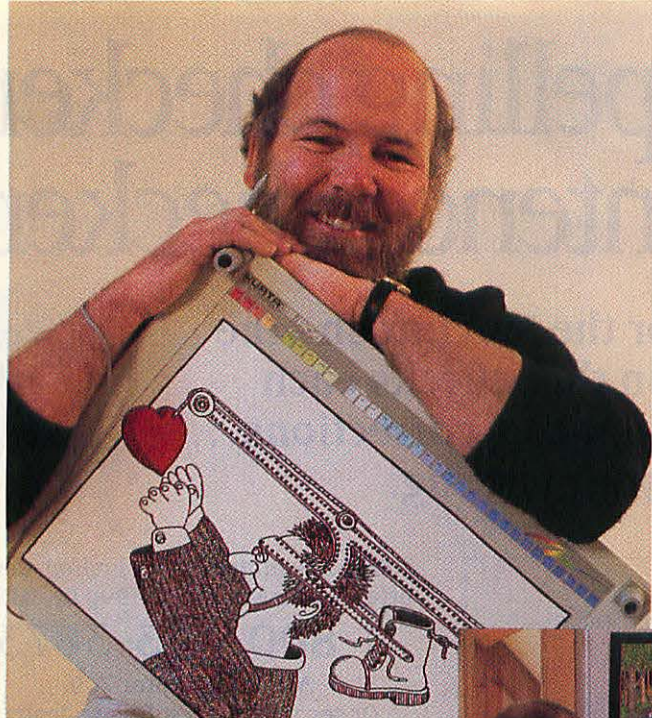
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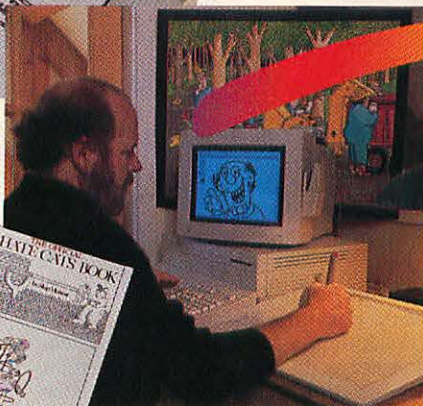




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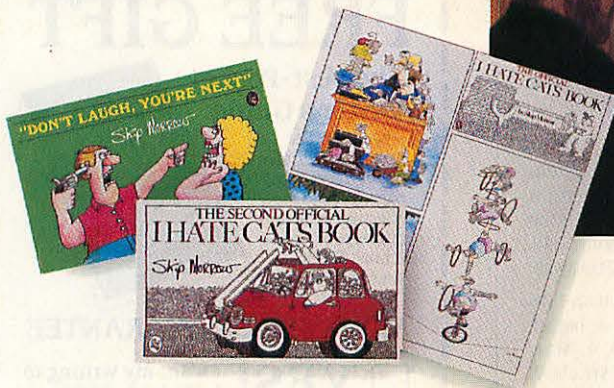
The author of the "Official I Hate Cats" books, "Foot Notes" greeting cards and other well-known cartoons learned computer drawing with a



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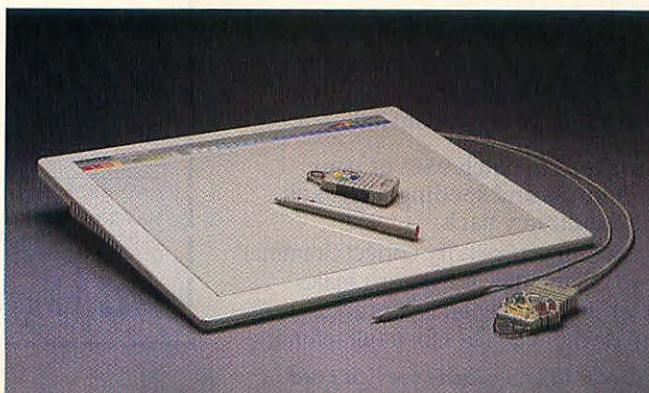
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No matter how hard you try to catch them, mistakes can slip into your writing.

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Now there's Correct Grammar for the Macintosh. It works like your own personal editor to correct mistakes in grammar, style, punctuation, usage... even spelling.

Correct Grammar makes your writing clearer and more precise. It saves you the embarrassment of having others catch your mistakes first.

## Takes the "Oops!" out of your writing.

Without Correct Grammar, you can proofread too quickly and makes mistakes. (Oops!)

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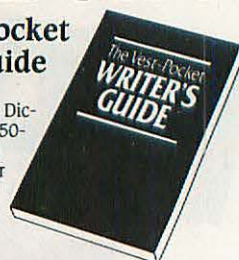
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# Just Say Low

## RETHINKING THE ENTRY-LEVEL MAC

BY STEVEN LEVY

For the past couple of years, Heidi Roizen, president of T/Maker Company, would stand up at developer forums and ask Apple executives what they intended to do about the low end of the market. Her remarks were unwelcome. The

czars of Macintosh seemed to operate under the impression that no problem existed. After all, they had sales figures to prove it. If the corporate zeal seemed to be geared toward producing a spiral of more powerful and expensive computers—yielding higher profit margins—wasn't that the mark of success in the business market?

Developers like Roizen, though, thought differently: they were concerned that the meager percentage of people who chose the Mac would never grow unless Apple considered the needs of those who operated under a budget when buying a computer. And it was a rare Macintosh user indeed who was not frustrated with the high cost of Apple computing.

As 1989 came to an end, even Apple's Panglossian officials were forced to consider their shortcomings in the low end. That deficiency was too prominent to ignore. An article by Andrew Pollack in the *New York Times* hit the nail on the head. "Eager to establish itself as a supplier to corporate America," Pollack wrote of Apple, "the company has been emphasizing its powerful machines that sell for \$4000 or more, too expensive for most of the consumers it once viewed as its main customers. Meanwhile, its less expensive machines have been somewhat neglected, and that neglect is beginning to show."

Actually, by the time Pollack's arti-

cle appeared—two days after Christmas—Apple's card palace was already tumbling. The holiday buying season had been a disappointment, with sales of the Mac Plus and the SE particularly flat. Apple was announcing that its profit expectations would not be met; there would be layoffs, and retrenching, and pandemonium in the executive offices. Allan Loren would be gone, and then Jean-Louis Gassée. A guy named Michael Spindler, John Sculley's flavor of the month, would be flown in from Europe. And what triggered all this? Apparently, the failure of the Macintosh in the low end.

### Low Riders of the Storm

OK, it wasn't *only* the low end that generated Apple's troubles. But mark this as a turning point. Previously, Apple management had been able to portray those clamoring for cheaper Macs as hippie crumb-snatchers who viewed Apple as some sort of populist collective, not the lean and mean multibillion-dollar corporation it really was. Anyway, didn't John Sculley, only a year ago, promise a new low-cost Mac—sometime in 1991?

Now it was clear that vague promises of a nifty successor to the Mac Plus would not do. And Cupertino's response was encouraging: Sculley himself admitted that management "indecision" was partially to blame for the problem. He promised a new em-



phasis on entry-level Macintoshes. The press leaked rumors of several different econo-Macs in development. Meanwhile, Apple cut the price of its compact Macintosh family—the de facto low-end Macs, the Plus and the SE. Oddly, the company ran print advertisements that associated the price cut with the collapse of the Berlin Wall, unintentionally implying that a bargain from Apple comes about as often as that sort of cataclysmic reordering of global politics. (Can we expect another price cut if Fidel Castro is overthrown?)

### Appropriate Technology

Still, the thorny problem remains: what should Apple do about making Macintoshes affordable? Some people believe Apple owes it to the general public to make competitively priced low-end computers. This is absurd. As Dick Shaffer, publisher of the *Technologic Computer Newsletter* puts it, "Apple is in business to make money."

However, by neglecting the low end of the market—that segment looking to buy computer systems for not

(continues)



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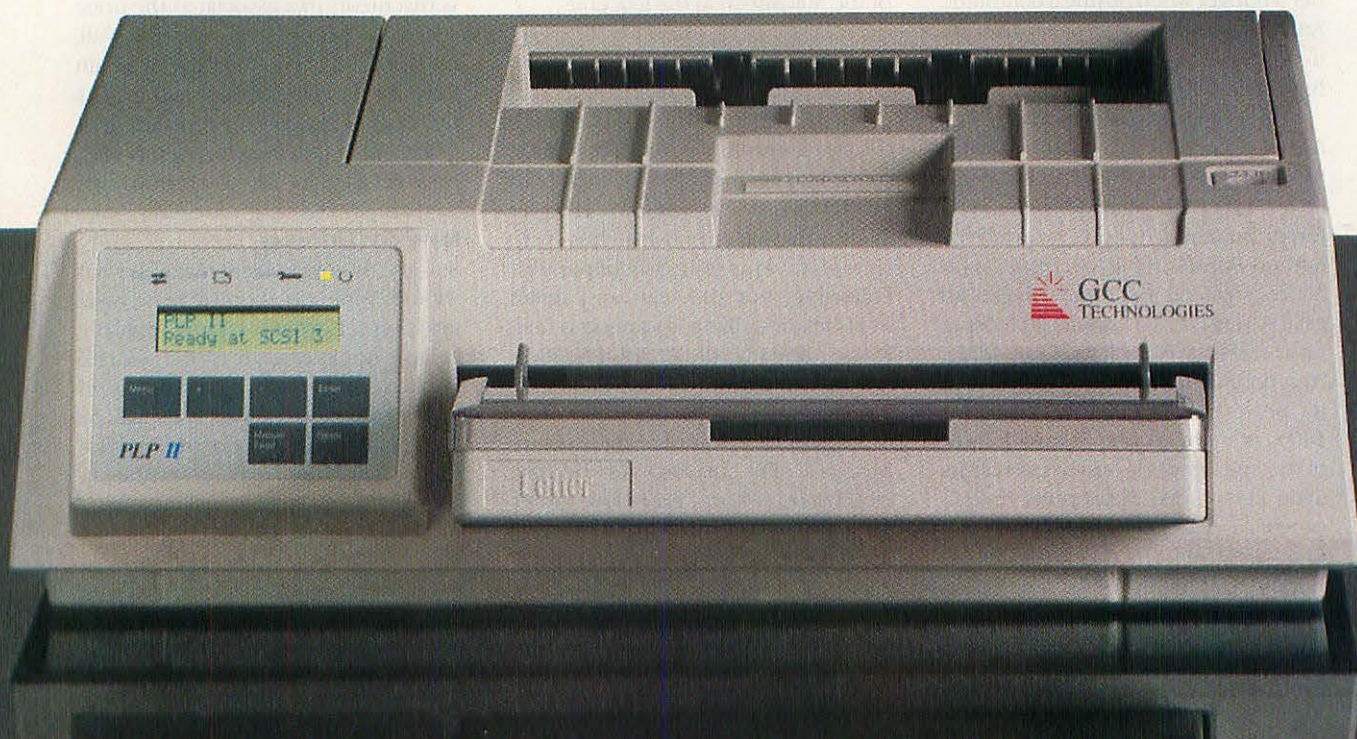
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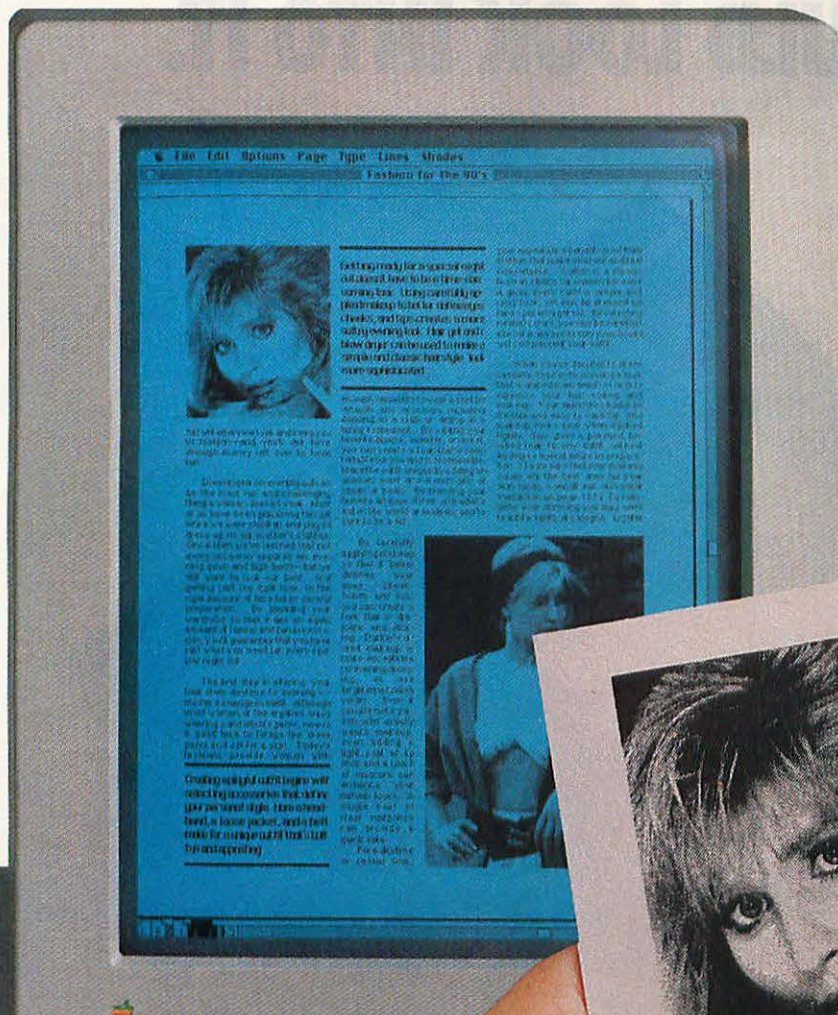
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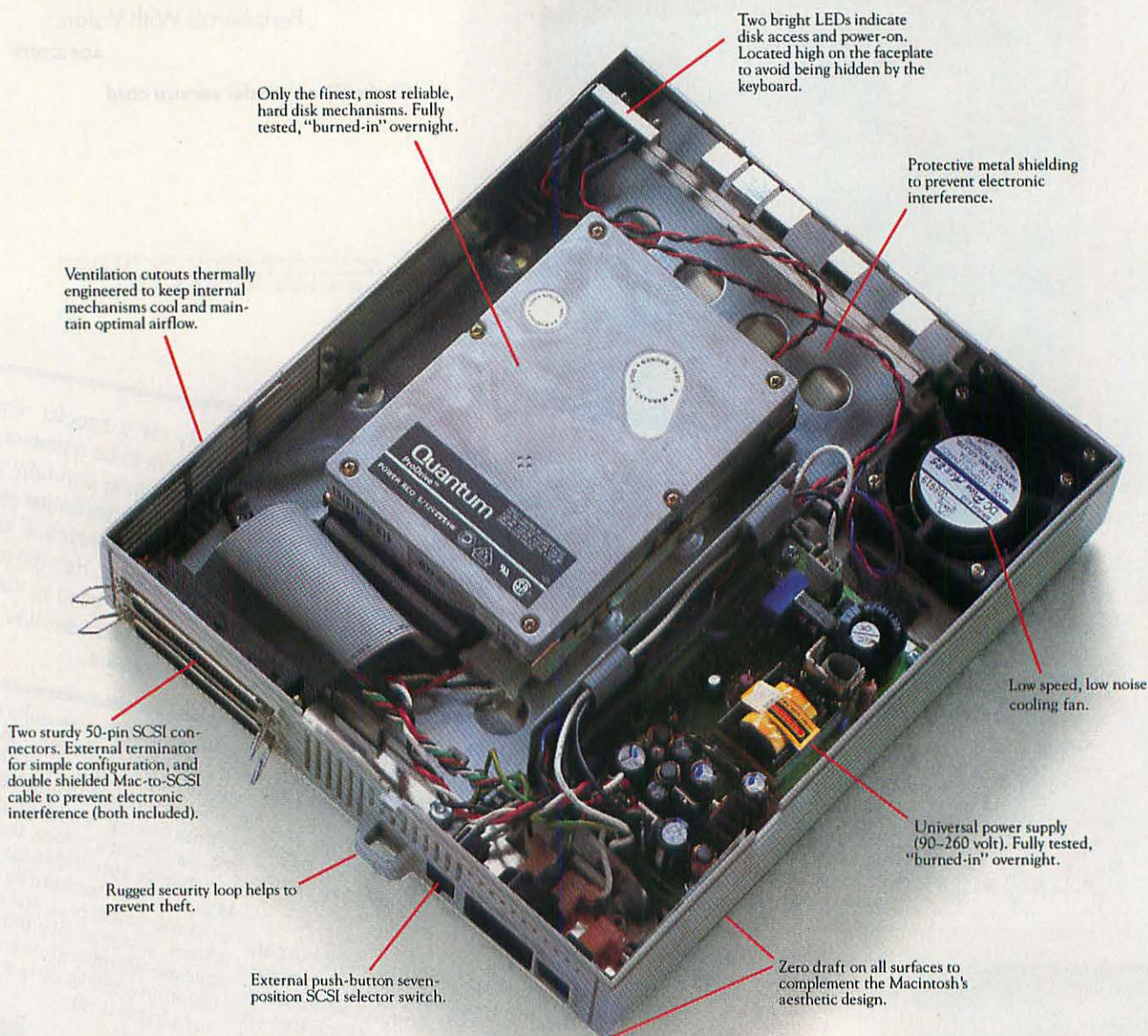
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much more than \$1500 or so, a price that gets you a decent PC clone setup—Apple executives are courting disaster even from the perspective of pure commerce. Shaffer envisions a scenario in the near future, when every generic PC clone runs Microsoft Windows (the poor man's Mac interface) and a HyperCard-like product. New buyers will walk into a computer store and see two machines running seemingly identical software, but one will cost hundreds of dollars less and run in color. Guess which one the novice buyer will choose? In light of this, Apple's problem boils down to "a failure to produce an appropriately priced product," says Shaffer.

And it isn't only people wandering into computer stores who are affected by price. Even big companies that have come to like the Mac often find that using SEs and Pluses throughout the company simply costs too much. After all, with Macintosh systems almost everything costs more—keyboards, disk drives, and especially

laser printers. So even companies like T/Maker, a software developer that lives by the Mac, can't afford to buy them for its support staff. When faced with the decision of which system to buy for her home, ultra-Mac-enthusiast Heidi Roizen bought a PC clone and a laser printer.

Roizen can deftly reel off reasons why Apple hasn't been more aggressive in the low end. But the bottom line, she concludes, is that Apple executives stuck to a philosophy of "financially speaking, if it ain't broke, don't fix it."

Charlie Jackson, president of Silicon Beach Software, attributes the failure to "smugness" among the high-level executives. (At least he didn't say *greed*, a word often associated with Apple's pricing.) With Apple's strategy of offering a bigger, more expensive computer every couple of months or so—and making a bigger margin of profit on these powerful machines—there seemed no reason to drastically cut the price of the Plus or SE, nor to

speed development of their successors. Until now.

### Apple Speaks

Naturally, I was curious to hear Apple's current point of view on the low end. My guide to Cupertino's Zeitgeist was Brody Keast, who holds the title of director of worldwide CPU product marketing. While admitting that the low end is an issue at Apple, Keast contends that the overall philosophy at Apple is a sound one: to create a wide product line based on a single system architecture. While more costly, powerful machines have shipped in the last couple of years, Keast says new low-cost machines have long been in development.

Keast took the opportunity to debunk a couple of myths. First, he says the price point of \$1000 has no particular magic. As an experiment Apple cut the price of a Mac Plus last Christmas, so that discounters could offer the Plus at a three-figure price.

(continues)

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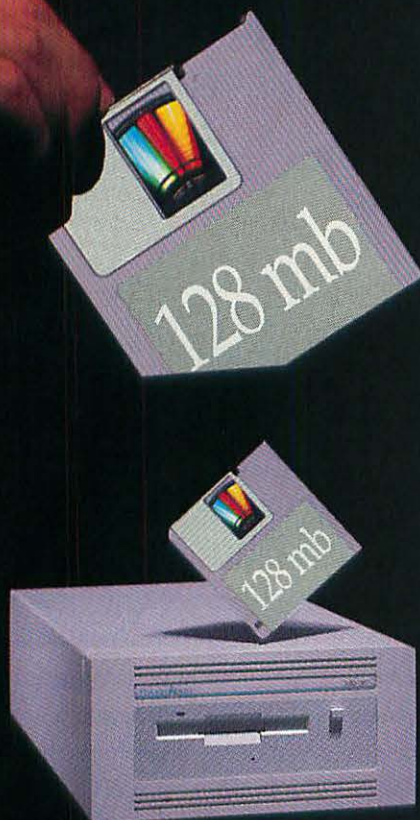
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Buyers responded tepidly. Second, the rumors that it costs less to manufacture an SE/30 than it does to make a Plus are just not true. "There are significant cost differences," he says.

Although Apple "cares as much as anyone about the low end, we don't feel we have to meet the prices of the clones of the DOS world—given we have a better product, we should be able to command a premium," Keast says. The problem comes not from the way Macs are priced, he continues, but from a frustrating inability on Apple's part to educate the market about the Mac's advantages. This frank admission naturally leads one to wonder what that ninja warrior of marketing John Sculley was doing when the advertising campaigns were being drawn, but I didn't press that point. Instead I asked whether Apple was happy with its current share of the computer market, a figure generally agreed to be about 15 percent of the total.

"Well, there are people who argue that market share is everything—lose it and your infrastructure will crumble. Others say it's not as important. Our goal is to try to grow at least twice as fast as the rest of the industry," Keast says that if Apple really was desperate for market share, it could license its unique operating system to companies who would make Mac clones. "But that would ruin us in the long run," he says. Since Apple would no longer have control over its operating system, "we would cease to do innovation. As soon as our products are not better, we're dead."

#### Mac to the Future

Presumably, that sort of innovation will be on display in the new low-end Macintoshes, which are not expected to hit the stores earlier than the end of this year, and it will probably be later. Cynics fear that Apple will intentionally cripple these products, so as not to lure customers from the more powerful, and more profitable, current offerings. But Brody Keast promises that the cynics are wrong on this one. "We've never castrated one product to favor another," he says. "If a new low-cost product causes cannibalization, that's what the customer wants."

Keast, of course, would not comment on specific features of these new

entry-level Macs. But listening between the lines, I got the impression that the computers in question would not be significantly more powerful than the current low-end workhorse, the SE. That would be a mistake.

Apple should swallow hard and realize that despite its victories in corporate America, the name of the game is still catch-up. So far, by not pursu-

ing market share while Apple technology is demonstrably superior, it's blown a big chance, some think irrevocably. "My feeling is that Apple will not be able to increase market share," says Charlie Jackson. "It will decrease." In light of this, Apple, why not throw the bomb? Give us a \$1000 sexy redesign of the mighty SE/30, with (continues)

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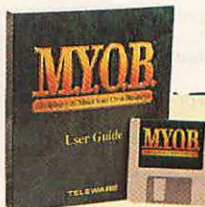
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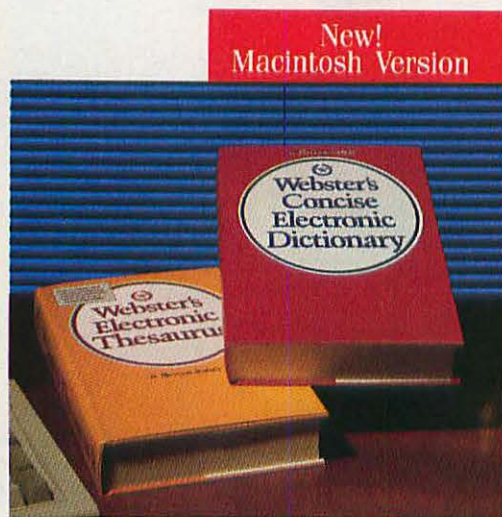
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an alternate modular version that could drive a color monitor. It would be the volkscomputer for the nineties. I'll bet Apple, which prides itself on manufacturing savvy, could produce it cheaply enough to make a profit and market share would grow.

Perhaps most important of all, a fire-breathing low-end computer would mean that the Macintosh would continue to be the software development machine of choice. If Apple sticks with the 68000 chip, a two-class system of haves and have-nots will be sustained: sure, the low-enders will be able to run the new software of the nineties, but it will plod along like a 45 rpm record at 33 revs. Go with the faster chip and everybody gets to use the mind-blowing applications of the future. And Mac developers—most of whom are poring over Windows-software-development manuals even as you read this—will have more incentive to *write* that software.

### Three Years and Counting

In order to put a positive spin on the low-end issue, Apple executives like to point out that just over three years ago, the most powerful Macintosh was the Mac Plus. The implication is "see how far we've come?" and it's an impressive argument. But it's not enough. At the very least, we should expect that Apple could make the same claim three years hence. In other words, the company's least powerful computer in 1993 should be comparable to the most powerful one currently available: the IIfx.

For this year, I'll hope for an SE/30-style machine for not much more than a thousand bucks. The operant word here is *hope*. I don't run that place, which is just as well since I'd have no idea how to invest my signing bonus. But on the off chance that Apple wants my humble advice, here goes: Read my lips, Mr. Sculley—sell us fully powered Macs for low prices. Otherwise too many people will settle for second best. And it'll hurt Apple more than it will hurt us. **M**

*Steven Levy is a Macworld columnist and the author of The Unicorn's Secret: Murder in the Age of Aquarius (NAL, 1989).*





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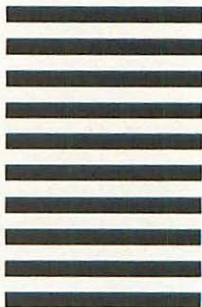
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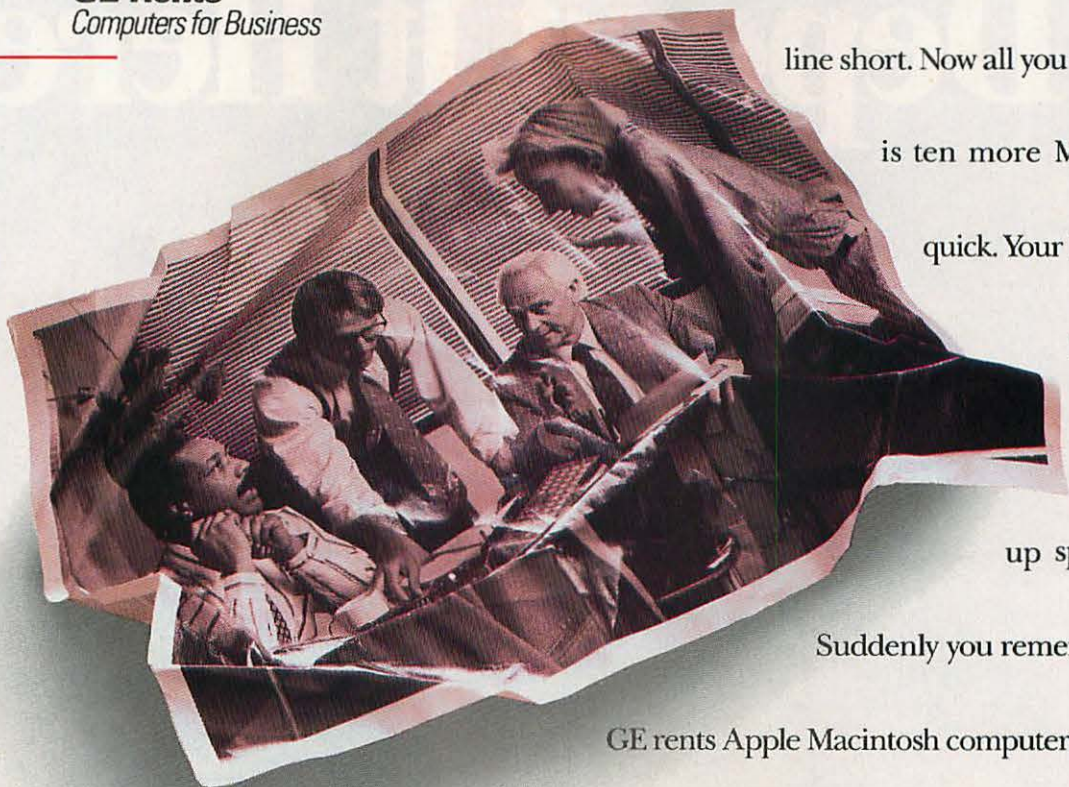
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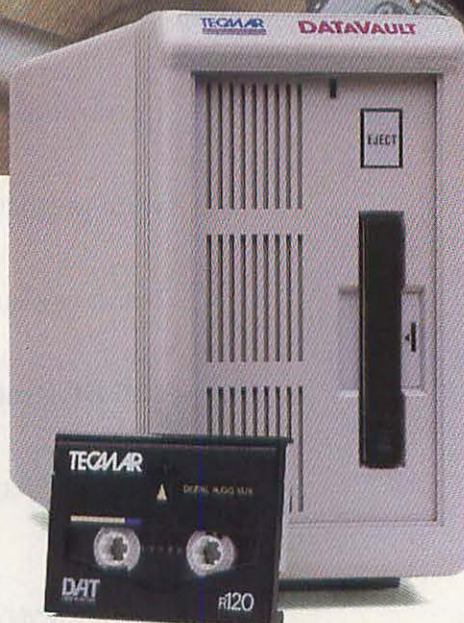
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# Comfortable Computing

SUFFERING FROM ACHEs AND PAINs?

HERE ARE TIPS AND PRODUCTS THAT MAY HELP.

BY DEBORAH BRANSCUM

As I write this I am sitting at home, in an old straight-backed chair, wishing earnestly that I owned a real office chair with true back support and adjustable everything. I'm sure there are plenty of other Mac owners out there who are

squinting through screen glare or developing back pain because it's too much trouble to get a decent desk or a real chair. But paying attention to your ergonomic needs will make computing a lot more pleasant—and healthy.

The study of ergonomics focuses on how workers and work fit together and how the environment and work tasks can be adapted to the wide range of human needs. The most important issues for computer users involve vision and posture, according to Rani Lueder, president of Humanics, an office-ergonomics consulting firm in Encino, California.

"Few realize how important it is to give people control over their lighting," says Lueder. "If you have five different people working under the same kind of lighting, each person probably perceives a different level of brightness." Age is also a factor. People in their midsixties need three times as much light for reading as people in their twenties and are much more sensitive to glare. But the biggest single factor is the contrast between inside light and outside light.

How the lighting should be adjusted depends on its brightness, the overall ambient light, and your task.

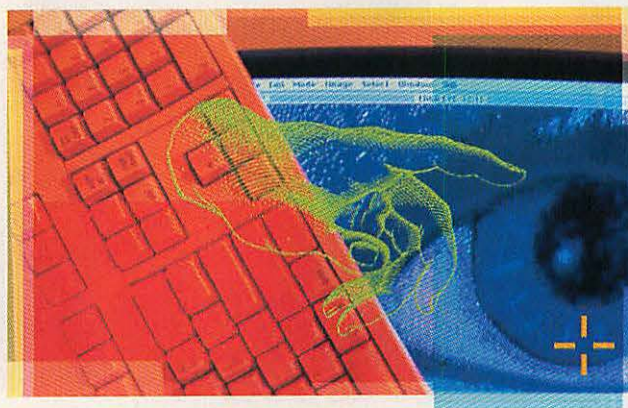
I have three fluorescent lights above my desk, for example. Lueder suggested I might want to unscrew a couple of them to reduce glare and overall brightness, then buy an inexpensive Luxo-type lamp to provide the light I need when working with paper. If you're lucky enough to sit next to a window, both facing it directly or

really a change that comes with age, particularly in one's forties. But near-sightedness is another kettle of fish. "A number of committees have come out and said there is no evidence that using a computer causes damage to the eye. What they are really saying is that myopia is not considered damage," says Lueder. "Working on close things, like computers or needlework, can help induce myopia. So lighting is really important and so is taking breaks." You should exercise your eye muscles periodically by focusing on longer distances. Just moving from close work on the computer to close work on paper won't do the trick.

So look out a window. Take a walk down the hall. Call someone.

You say the lighting's licked? Okay, it's time to perfect your posture. Unsurprisingly, sitting in a bad position is bad, but holding the

position is worse. According to *The Ergonomics Payoff* (Nichols Publishing Company, 1986), "movement promotes circulation by the pumping action of the muscles as they extend and contract and prevents the buildup of pressure in the tissues, joints, muscles, (continues)

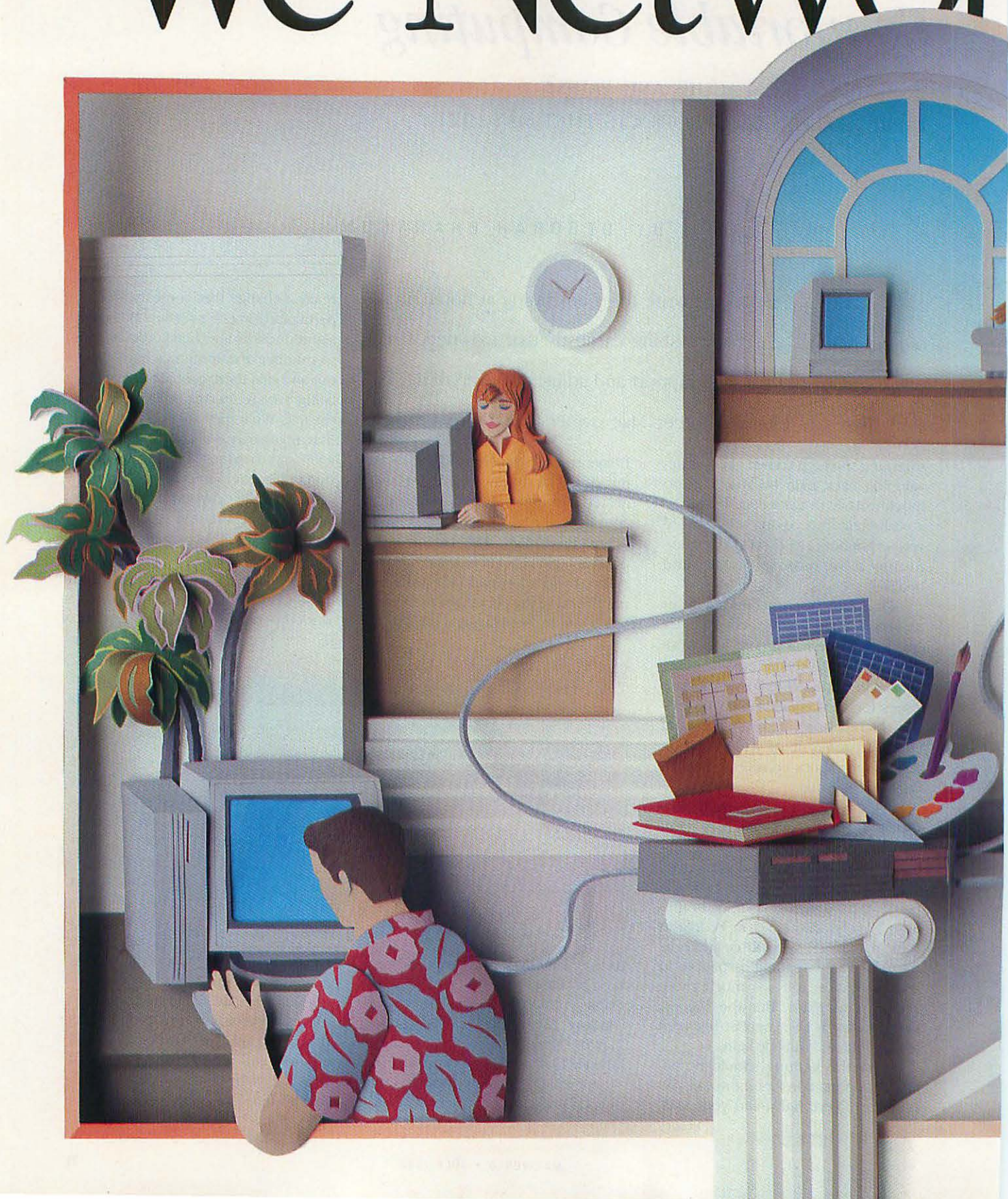


turning your back to it can cause contrast problems. It's best to have your display screen perpendicular to the window. (See "Warning: Computing Can Be Hazardous to Your Health," January 1990, for additional advice.)

Increasing farsightedness is sometimes blamed on computers, when it's

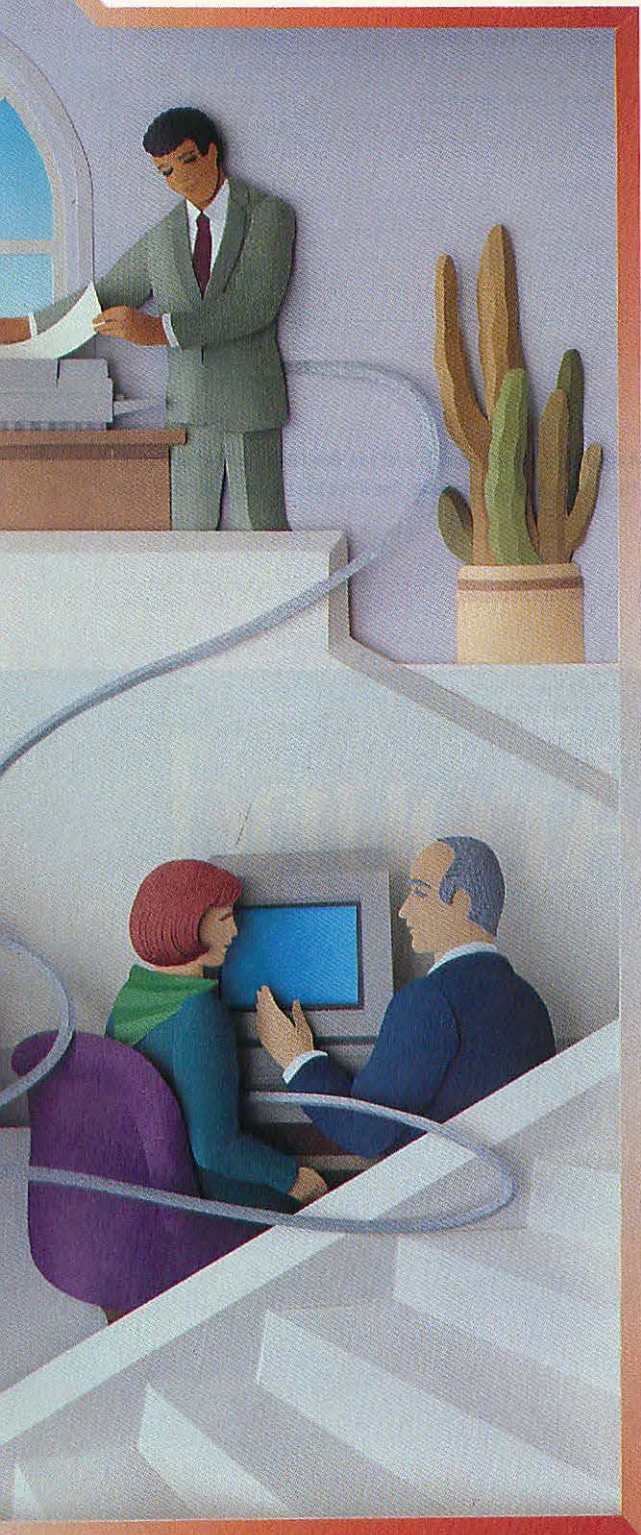


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Research by Jonathan Cassell

The fact that a desk is adjustable doesn't mean it's ergonomic. And the fact that a chair is called ergonomic doesn't mean it's for you. Don't buy a product unless it can be returned for a full refund if you're unhappy with it—it takes time to know if a piece of furniture was the right purchase. And if you buy through mail order, pay by credit card, not check. It gives you more legal protection if anything goes wrong.

# The Run-Around.





and spine." So a good workstation gives you freedom of movement, Lueder says. Try to keep your wrists straight as you type and avoid repetitive movements as much as possible.

As always, it's better to adjust the work to the worker than the other way around. That means an adjustable monitor or computer; desks at the right height; keyboards or keyboard stands where you want them; a good chair that lets you move but also provides needed physical support. Stresses on muscles and the spine are relieved when posture is supported by lumbar supports, armrests, palm rests, and backrests, according to *The Ergonomics Payoff*.

"Practical Products" lists the makers of products that might be considered ergonomic. (I can't vouch for them, however.) Below is a quick run-down of product areas and some interesting items.

**Antiglare Screens** According to Lueder, antiglare screens should be considered only as a last resort be-

cause of distortion and image-quality issues. But many people can't control the lighting where they work so they need such screens, which are available in plastic, glass, and mesh. Many products stick to the front of the display. Some, like Optical Coating Laboratory's Glare/Guard Profile, fit over the display and match the color of the monitor. Anacom's Sunflex line of screens actually fits between the display tube and glass bezel for a tight and invisible fit. An informal survey at *Macworld* suggests that antiglare-screen preference is highly subjective.

**Vision Products** *The Ergonomics Payoff* advises that bifocal, trifocal, and so-called reading glasses are often incompatible with computer work. American Optical (508/765-9711) claims to sell the first ergonomically designed lens for computer users, intended as a second pair of glasses for when you work at the keyboard. Other companies make similar products. See an eye-care specialist for advice and referrals.

If you need help simply seeing the screen, at least two companies provide products that enlarge screen objects, but not without distortion. Macnifier, from Premtech Corporation, reportedly increases screen image by 130 percent. I don't care for the Macnifier but our stalwart intern has grown very fond of his. I prefer NuVu, from Less Gauss Corporation. Less Gauss claims NuVu enlarges the screen by more than 70 percent. The product fits over a compact Mac like a hood, with an adjustable enlarging screen. Both products cause some distortion.

**Furniture** ScanCo and Jenston Manufacturing are among the furniture companies wooing Macintosh users. ScanCo's MacTable is an attractive desk that can be configured for either a compact Mac or Mac II setup. The MacTable offers plenty of room for a printer and other stuff. Less spacious but more fun is the Incliner from Jenston Manufacturing. It's designed for people who want to compute from a  
(continues)

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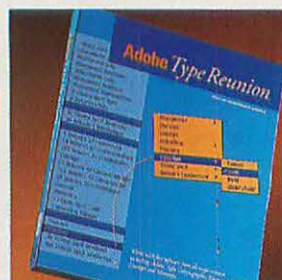
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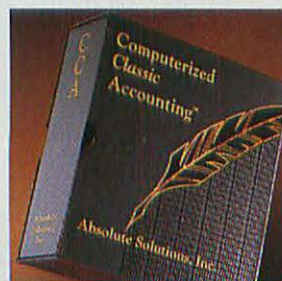
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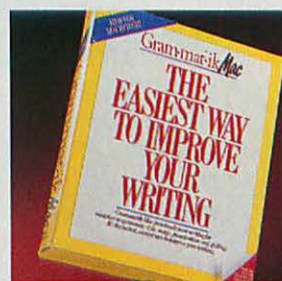
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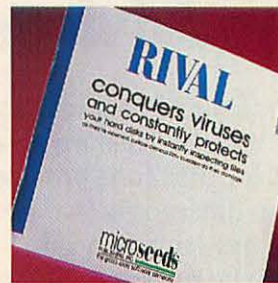


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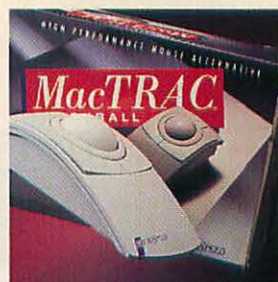
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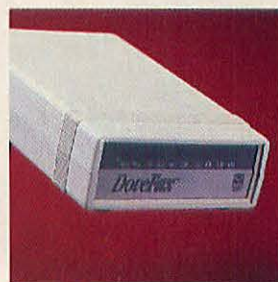
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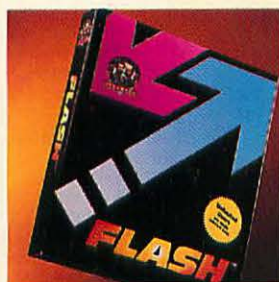


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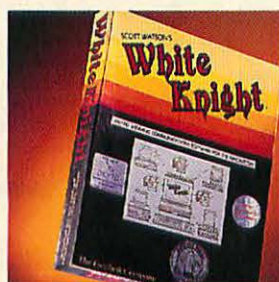
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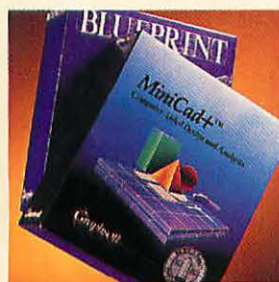
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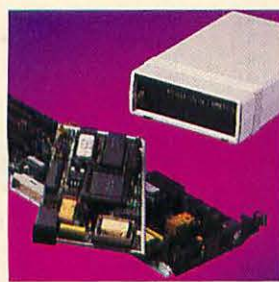
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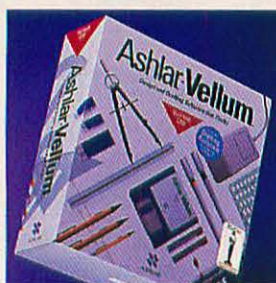
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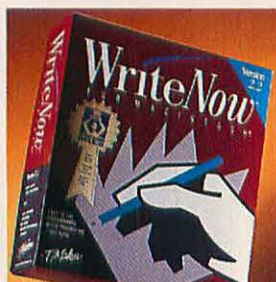
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### Scanners

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Half Page Scanner/400 ..... 314.  
Page Scanner ..... 758.

**Logitech**  
Scan Man 32 ..... 336.

**Thunderware**  
Lightning Scan ..... 368.  
ThunderScan 5.0 ..... 184.

### Modems

**Everex**  
EMAC MD2400 MNP 5 ..... 224.

**MacTech - SmartLink Modem**  
2400m (MNP 5) ..... 245.  
2400s w/ cable ..... 139.

**Prometheus**  
2400Mini ..... 208.  
2400 SE Internal ..... 208.  
2400/4800FAX Port ..... CALL  
9600m Plus V.32 ..... 768.

**Shiva Corporation**  
NetModem V2400 ..... 434.  
NetModem 9600V.32 ..... CALL

**Supra Corp.**  
Supra Modem 2400 ..... 128.  
SupraPlus ..... CALL

**U.S. Robotics**  
9600 HST Baud ..... 685.

### Fax Modems

**Abaton**  
InterFax 12/48 ..... 264.  
InterFax 24/96 ..... 418.

**Dove**  
DoveFax 24/96 ..... 278.

**Orchid Technology**  
Orchid Fax Modem ..... 446.

### Monitors & Cards

**Aapps Corporation**  
DigiVideo ..... 399.  
DigiVideo Color ..... CALL  
MicroTV ..... 265.

**Digital Vision**  
Computer Eyes-Color ..... 348.  
Computer Eyes-B/W ..... 194.

**Micron Color Cards**  
for SE/30, II, IIx, IIcx, & Ili  
Xceed (8 Bit - 13") ..... 385.  
Xceed (8 Bit - 19") ..... 598.

**RasterOps**  
ColorBoards  
208+ (II, IIx, IIcx, Ili) ..... CALL  
208+ (SE/30) ..... CALL  
324 (32 Bit - 19") ..... CALL  
364 (II series - 13") ..... CALL  
364 (SE/30 - 13") ..... CALL

**Sony - Color Multiscan**  
14" 1304 HG Color ..... 795.

### Accelerators & Upgrades

**Dove**  
MacSnap Upgrades  
524 (512k to 1 Mb) ..... 192.  
524e (512k to 1 Mb) ..... 185.  
524s (524e w/SCSI) ..... 238.  
548 (512k to 2 Mb) ..... 432.  
548e (512k to 2 Mb) ..... 418.  
548s (548e w/SCSI) ..... 478.  
SCSI Port Adapter ..... 109.

**Marathon 020 SE Accelerators**  
MSE1 (Board Only) ..... 428.  
MSE2 (...w/1 Mb) ..... 693.  
MSE3 (...w/68881) ..... 583.  
MSE4 (...w/68881 & 1Mb) ..... 893.

**Marathon 030 Accelerators**  
Mac II series or SE/30 ..... ea. 965.  
Marathon Racer ..... 148.

**Marathon 030 Upgrade**  
Mac Plus, SE, & II ..... CALL

**Macintosh Memory Upgrades**  
available in 70, 80 & 100ns  
256k SIMMs ..... Call for prices  
1 Mb SIMMs ..... Call for prices

**Motorola**  
Math Co-Processors  
68882 - 16MHz ..... 289.  
68882 - 25MHz ..... 399.  
68882 - 33MHz ..... 695.  
68882 - 40MHz ..... 748.

**Orchid Technology**  
Mac Sprint II ..... 249.

**Total Systems**  
Gemini 020/030 Accelerators  
68020 SE - 16MHz ..... 697.  
68020 SE - 25MHz ..... 1,118.  
68030 SE - 16MHz ..... 976.  
68030 SE - 20MHz ..... 1,118.  
68030 SE - 25MHz ..... 1,285.

GeminiKit (allows user to put Gemini 020/030 Accelerators in Mac+, 512K, 512K, & 128K. Includes internal fan, SCSI port, and space for extra RAM memory) ..... 149.

**Backups & HD Drives**  
**Everex - EMAC Drives**  
60/60dlt Deluxe ..... 1,495.  
60t (Tape Backup) ..... 658.  
Impact Tape (150 Mb) ..... 985.

**PLI (Peripheral Land, Inc.)**  
TurboFloppy 1.4 ..... 358.

### Networking Hardware

**Cayman Systems**  
Gator Box ..... 2,159.  
Gator Share Software ..... 1,398.  
Gator Card (Mac SE, II, IIx, IIcx, Ili, or SE/30) ..... ea. 460.

**Dove**  
FastNet Equipment  
FastNet AE ..... 1,249.  
FastNet SE or SE/30 ..... 374.  
FastNet III ..... 374.  
SCSI Cheapernet ..... 748.  
SCSI Thickwire Ethernet ..... 849.

**Farallon - PhoneNet**  
DB-9 ..... 31.  
DIN-8 ..... 31.  
DIN-8 (10 Pack) ..... 198.  
Star Connector ..... 17.  
Star Connector (10 Pack) ..... 137.  
Star Controller ..... 824.  
Star Controller EN ..... CALL  
Repeater ..... 312.

**Kinetics**  
EtherPort ..... 469.  
EtherPort Lattis Net ..... 498.  
Fast Path ..... 1,998.

**MacTech**  
ZoneNet - DB-9 or DIN-8 ..... 17.

**Nuvotech**  
NuvoLink II ..... 271.  
NuvoLink SC ..... 309.  
Turbo Bridge ..... 318.  
Turbo Net - DB-9 ..... 22.  
Turbo Net - DIN-8 ..... 21.  
Turbo Net ST - DB-9 ..... 30.  
Turbo Net ST - DIN-8 ..... 30.

**Shiva Corporation**  
EtherGate ..... 1,824.  
NetBridge ..... 338.  
NetSerial ..... 274.  
TeleBridge ..... 338.

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TIFF.

**TheComplete Scanners..... \$314./\$758.**



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Finally a Ada compiler  
for the Macintosh.  
Powerful and complete,  
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government agencies re-  
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programming of this  
state-of-the-art com-  
piler.

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Fantasy role playing  
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**NuvoLink SC & II..... See listings**



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the functionality of Mi-  
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black & white in 128  
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friendly and supported by  
HyperCard. Perfect for  
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sentations.

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TOPS	
Flash Card (TOPS Dos) .....	158.
TOPS FlashBox .....	122.
TOPS Repeater .....	128.

## Miscellaneous

American Power Conversion	
UPS 110SE .....	268.

## Dayna Communications

Dayna Talk Connector	
DaynaFile - Single Drive	99.
DaynaFile - Dual Drive	
DI0100 (360k) .....	497.
DI0200 (1.2Mb) .....	605.
DI0300 (720k) .....	605.
DI0400 (1.44Mb) .....	685.
DaynaFile - Dual Drive	
DI0102 (360k/1.2Mb) .....	729.
DI0103 (360k/720k) .....	729.
DI0104 (360k/1.44Mb) .....	748.
DI0204 (1.2Mb/1.44Mb) .....	898.

Fortis	
DM1310 Printer .....	235.
Ribbon .....	6.

Kurta - Is/ADB Tablets	
Cordless 4 Button Cursor .....	64.
8.5" x 11" (w/Stylus) .....	254.
12" x 12" (w/Stylus) .....	384.
12" x 17" (w/Stylus) .....	624.

## NEC CD ROM Drive

Battery Pack .....	68.
Intersect CDR-35 .....	524.

## Orange Micro

Grappler C/Mac/GS .....	84.
Grappler LS .....	68.
Grappler Mac LX .....	128.
Mac 286 NuBus Card .....	1,099.
Mac 86 NuBus Card .....	498.

Summagraphics Bit Pad Plus	
12" x 12" Tablet - ADB .....	315.

## ENTERTAINMENT

Access Software	
World Class Leader Board .....	28.

## Accolade

4th & Inches .....	27.
FastBreak .....	27.
Grand Prix Circuit .....	27.
Hardball .....	25.
Mean 18 .....	25.

## Activision

Cosmic Osmo .....	40.
Manhole .....	28.
Manhole CD Version .....	34.

## Addison Wesley

The Hobbit .....	26.
Fellowship of The Ring .....	26.
The Shadows of Mordor .....	26.
The Crack of Doom .....	26.

## Broderbund

Ancient Art of War .....	25.
Ancient Art of War at Sea .....	25.
PlayMaker Football .....	29.
Shufflepuck Cafe .....	22.
SimCity 1.1 .....	28.
SimCity Color .....	47.
Star Wars .....	23.
Where In Europe Is Carmen Sandiego? .....	28.
Where In The U.S.A. Is Carmen Sandiego? .....	28.
Where In The World Is Carmen Sandiego? .....	28.

## Bullseye Software

Ferrari Grand Prix .....	31.
P-51 Mustang Flight Simulator .....	30.

## Casady & Greene

Crystal Quest 2.2 .....	24.
...w/Critter Editor .....	39.

## Centron

Casino Master B & W .....	44.
Casino Master Color .....	49.

## Data East

Super HangOn .....	26.
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## Electronic Arts

Bard's Tale .....	30.
Chessmaster 2100 .....	32.
Chuck Yeager's A.F.T. ....	30.
Might & Magic II .....	38.
Panzer Battles .....	28.
Patton Vs Rommel .....	14.
Starlight .....	39.

## Infocom

Arthur: Quest for Excalibur ..	28.
Quarterstaff .....	28.

## Inline Design

Bomber (w/Headphones) ....	25.
----------------------------	-----

## Lucastilm

Pipe Dream .....	25.
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## Mediagenic

Shanghai .....	19.
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## Micro League Sports

MicroLeague Baseball II .....	39.
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## MicroProse

Pirates! .....	35.
----------------	-----

## Microsoft

Flight Simulator 1.02 .....	31.
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## Miles Computing

Fool's Errand .....	31.
Harrier Strike Mission II ....	31.
Puzzle Gallery .....	26.

## Mindscape

Aussie Joker Poker .....	19.
Balance of Power 1990 .....	28.
Colony .....	28.
Crossword Magic .....	28.
Deja Vu II .....	28.
Gauntlet .....	24.
Shadowgate .....	28.
Trust & Betrayal .....	29.
Uninvited .....	28.

## Origin Systems

Autoduel .....	26.
Space Rogue .....	30.

## Postcraft International

Citadel .....	27.
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## Premier Technology

NetTrek .....	33.
Strategic Conquest 2.0 .....	33.

## Shodan

Leprechaun .....	29.
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## Silicon Beach Software

Apache Strike 1.1 .....	19.
Beyond Dark Castle .....	19.
Dark Castle .....	19.

## Software Toolworks

Cribbage King/Gin King .....	38.
Hunt for Red October .....	20.
Life & Death .....	31.

## Sphere

Falcon 2.2 .....	30.
Gato 1.4 .....	25.
PT-109 .....	25.
Solitaire Royale .....	19.
Tetris (Color Version) .....	20.
Welltris .....	20.

## Spinnaker

Sargon IV .....	29.
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## Strategic Simulations, Inc.

AD&D: Pool of Radiance ....	32.
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## Strategic Studies Group

American Civil War .....	CALL
Halls of Montezuma .....	30.

## Three Sixty

Sands of Fire .....	34.

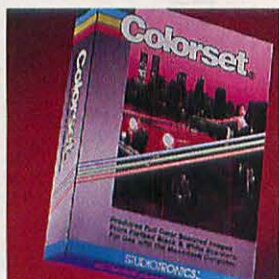


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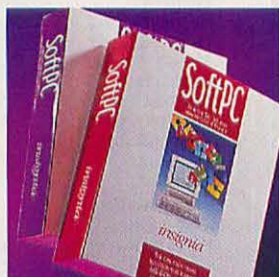
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**Colorset 1.5 ..... \$228.**



**Insignia Solutions**  
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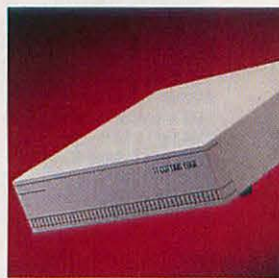
**SoftPC -- EGA/AT ..... See listings**

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**Monitors ..... See listings**



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**Hard Drives ..... See listings**

### MasterWorks Training Series

M1 Database & Form Let.	36.
M2 Advanced Database	36.
M3 Spreadsheets	36.
M4 Word Processing	36.

### PageTutor Training Series

P1 Beginning PageMaker	36.
P2 Int. PageMaker	36.
P3 Tips & Techniques	36.
P4 Advanced Features	36.

### LearnWord Training Series

W1 Beginning Level	36.
W2 Intermediate Level	36.
W3 Advanced Level	36.
W4 Additional Features	36.

### Excelerate Training Series

XL1 Beg. Spreadsheets	36.
XL2 Int. Spreadsheets	36.
XL3 Adv. Spreadsheets	36.
XL4 Creating Bus. Graphs	36.
XL5 Building Databases	36.
XL6 Beginning Macros	36.
XL7 Advanced Macros	36.
XL8 Macros for Excel 2.2	36.
XL9 What's New for 2.2	36.

### Simon & Schuster

Typing Tutor IV	28.
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### Software Toolworks

M. Beacon Teaches Typing	31.
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### Spinnaker

Typing Made Easy	25.
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### True BASIC, Inc.

Algebra	31.
Arithmetic	31.
Calculus	31.
Discrete Mathematics	31.
Pre-Calculus/Trig	31.
Probability Theory	31.
TrueSTAT	31.
Combo Packs w/Workbook	
Algebra Combo Pack	44.
Calculus Combo Pack	44.
Pre-Calculus Combo Pack	44.

## MUSIC

### Arns Nova

Practica Musica	68.
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### Bogas Productions

Studio Session	44.
Super Studio Session	64.
Brass, Country, Heavy Metal, Sound Effects, String Quartet	13.
each	

### Braderbund

Jam Session	28.
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### Coda

Finale 2.0	568.
Mac Drums	30.
MusicProse	187.
Perceive	49.

### Electronic Arts

Dlx Music Const. Set	84.
Deluxe Recorder	98.

### Farallon

MacRecorder 2.0	158.
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### Mark of The Unicorn

Professional Composer	394.
Professional Performer	394.

### Passport Designs

Click Tracks	309.
MasterTracks Jr.	89.
MasterTracks Pro 4.0	355.
MIDI Interface	75.
MIDI Transport	309.
Note Writer II	320.

### Primera Software

Different Drummer	58.
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### Resonate

Listen 2.1	61.
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## ACCESSORIES

### Abaton

Pro Point ADB (SE & II)	79.
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### Addison Wesley

Inside Macintosh, Vol. 1	19.
Inside Macintosh, Vol. 2	19.
Inside Macintosh, Vol. 3	17.
Inside Macintosh, Vol. 4	20.
Inside Macintosh, Vol. 5	22.
Inside Macintosh, X-Ref	8.
Macintosh Programming Secrets	19.

### Advanced Gravis

MouseStick	64.
MouseStick (ADB)	84.

### Altra

Felix	125.
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### Avery Labels

Address Labels	
2.5" x 15/16" (3000) White	12.
3.5" x 15/16" (1000) White	5.
3.5" x 15/16" (3750) White	13.
3.5" x 15/16" (500) Clear	13.
Diskette Labels	
2.75" x 2.75" (250) White	14.
Mac Disks (630)	29.
3.5" (80) Color Coded	4.
File Folder Labels	
3.5" x 7/16" (1000) Asst	7.

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## MONITORS

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Two Page Display	\$929.

### Laser Printer Labels

1" x 2-5/8" (3000) White	16.
1.5" x 4" (1400) White	18.
1/2" x 1.75" (2000)	7.
Laser Transparencies (50)	22.

### Bantam Books

Illustrator 88 Handbook	19.
Mastering Wingz	21.
HyperCard Handbook	22.

### Byte Brothers

Care-Free Security Kits-	
for Mac 512K & Plus	26.
for Mac SE, II & IICx	26.

### Casio

Casio B.O.S.S.	219.
CasioLink/Mac	98.

### CoStar

CoStar Labeler	194.
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### Datadesk

Hyper Dialer	29.
Mac 101 Keyboard	138.
Switchboard	175.

### Ergotron

MacTilt	68.
Mouse Cleaner 360	9.

### Fujitsu

800k Disk Drive	159.
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### Golden Ribbons

Multi Colored	7.
Black	3.

### Goldstein & Blair

Macintosh Bible	19.
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### Kalmar Designs

Teakwood Disk File Cabinet	
45 Disks	14.
90 Disks	21.
135 Disks	30.

### Kensington Microwave

Anti-Glare Filter (beige, platinum)	32.
Anti-Glare Filter for SE	56.
Apple Security Kit System	34.
Mac II Stand	19.
System Saver Mac	63.
Tilt Swivel	21.
Turbo Mouse	108.
Turbo Mouse ADB	108.

### Keytronic Keyboard

Mac Pro Kb-105 ADB	125.
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### Kraft

QuickStick (512k & Plus)	39.
QuickStick ADB	49.

### Mac Packs

Gray, Navy, or Wine	
ImageWriter Bag	45.
Mac Plus/SE Bag	55.
Mac SE Bag XI	69.

### Mac Zone

7 Outlet Surge Protector	24.
Leatherette Disk Notebook	12.
Mouse Pads	each 6.
SCSI Tester	39.
Mac Tool Kit Mac w	
Grounding Strap	15.

### Maxell Backup Tapes

150 Mb Tapes	24.
60 Mb Backup Tape	19.

### Mobius

Fanny Mac	55.
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### MSC Technologies

A+ Mouse (512k & Plus)	58.
A+ Mouse ADB	75.

### Sony Backup Tapes

DC 2000 40 Mb. Tape	19.
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### Sony Disks

Double Sided - 10 Pk.	13.
Bulk (Units of 50)	each 59.
HD (1.44 Mb) 10 Pk.	22.
Bulk (Units of 50)	each 1.80

### Targus Bags

Black, Gray, Navy, or Wine	
Deluxe for Extended Kybd	68.
ImageWriter (Black only)	45.
Mac/SE Bag (Black only)	54.
Mac IICx/IICx Bag	75.

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Established 1986

	Integra 20	Integra 40	Integra 40Q	Porta 40	PLI 50 Turbo	Integra 80	Integra 80Q
<b>Zone Price</b>	\$389	\$449	\$588	\$640	\$618	\$639	\$798
<b>Zone Code</b>	2636	2638	2738	3263	3268	2640	2739
<b>Category</b>	External Drive	External Drive	External Drive	External Drive	External Drive	External Drive	External Drive
<b>Manufacturer</b>	Dolphin Systems	Dolphin Systems	Dolphin Systems	Dolphin Systems	Peripheral Land, Inc.	Dolphin Systems	Dolphin Systems
<b>OEM Mechanism</b>	Seagate ST125N-1	Seagate ST157N	Quantum ProDrive 40S	Connar 3040	Seagate ST157N-1	Seagate ST1096N-1	Quantum ProDrive 80S
<b>Formatted Capacity</b>	20.1 MB	47 MB	40 MB	40 MB	48 MB	20.1 MB	78.8 MB
<b>Access Time (ms)</b>	28 ms	32 ms	19 ms	25 ms	28 ms	28 ms	19 ms
<b>ID Selection</b>	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary
<b>Termination</b>	Internal	Internal	Internal	Internal	Internal	Internal	Internal
<b>Cable (length, type)</b>	4 ft. - 50/25 Pin	4 ft. - 50/25 Pin	4 ft. - 50/25 Pin	4 ft. - 50/25 Pin	3 ft. - 50/25 Pin	4 ft. - 50/25 Pin	4 ft. - 50/25 Pin
<b>Warranty</b>	1 Year	1 Year	2 Year	2 Year	1 Year	1 Year	2 Year
<b>Software Bundled</b>	Dolphin Install, 7 MB Public Domain & Shareware	Dolphin Install, 7 MB Public Domain & Shareware	Dolphin Install, 7 MB Public Domain & Shareware	Dolphin Install, 7 MB Public Domain & Shareware, Battery Saver	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer	Dolphin Install, 7 MB Public Domain & Shareware	Dolphin Install, 7 MB Public Domain & Shareware
	PLI 100 Turbo	Porta 100	Integra 105Q	Integra 170	PLI 250 Turbo	Integra 300	PLI 300 Turbo
<b>Zone Price</b>	\$998	\$998	\$998	\$1488	\$1948	\$2398	\$2398
<b>Zone Code</b>	3273	3264	2742	3271	3269	3272	3270
<b>Category</b>	External Drive	External Drive	External Drive	External Drive	External Drive	External Drive	External Drive
<b>Manufacturer</b>	Peripheral Land, Inc.	Dolphin Systems	Dolphin Systems	Dolphin Systems	Peripheral Land, Inc.	Dolphin Systems	Peripheral Land, Inc.
<b>OEM Mechanism</b>	Connar 100	Connar 30100	Quantum ProDrive 105S	Imprimis 170	Hitachi 250	Imprimis 300	Imprimis 300
<b>Formatted Capacity</b>	105 MB	102 MB	102 MB	173 MB	251 MB	330 MB	327 MB
<b>Access Time (ms)</b>	20 ms	25 ms	19 ms	18 ms	16 ms	14 ms	16.5 ms
<b>ID Selection</b>	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary
<b>Termination</b>	Internal	Internal	Internal	Internal	Internal	Internal	Internal
<b>Cable (length, type)</b>	3 ft. - 50/25 Pin	4 ft. - 50/25 Pin	4 ft. - 50/25 Pin	4 ft. - 50/25 Pin	3 ft. - 50/25 Pin	4 ft. - 50/25 Pin	3 ft. - 50/25 Pin
<b>Warranty</b>	1 Year	2 Year	2 Year	1 Year	1 Year	1 Year	1 Year
<b>Software Bundled</b>	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer	Dolphin Install, 7 MB Public Domain & Shareware, Battery Saver	Dolphin Install, 7 MB Public Domain & Shareware	Dolphin Install, 7 MB Public Domain & Shareware	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer	Dolphin Install, 7 MB Public Domain & Shareware	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer
	Quantum 40	Quantum 80	Quantum 105	Flipper 44	Infinity 40	Infinity 40/40	Infinity Optical
<b>Zone Price</b>	\$449	\$687	\$797	\$795	\$1097	\$1936	\$4248
<b>Zone Code</b>	3245/3246/3265	3247/3248/3266	3249/3250/3267	2416	2181	2182	2851
<b>Category</b>	Internal Drive	Internal Drive	Internal Drive	Removable Media	Removable Media	Removable Media	Optical Media
<b>Manufacturer</b>	Dolphin Systems	Dolphin Systems	Dolphin Systems	Dolphin Systems	Peripheral Land, Inc.	Peripheral Land, Inc.	Peripheral Land, Inc.
<b>OEM Mechanism</b>	Quantum ProDrive 40S	Quantum ProDrive 80S	Quantum ProDrive 105S	Syquest SQ555	Syquest SQ555	Syquest SQ555	Sany
<b>Formatted Capacity</b>	39.4 MB	78.8 MB	103 MB	43 MB	42.5 MB	42.5 MB/42.45 MB	573 MB
<b>Access Time (ms)</b>	19 ms	19 ms	12 ms	20 ms	19 ms	19 ms	60 ms
<b>ID Selection</b>	---	---	---	Rotary	Rotary	Rotary	Rotary
<b>Termination</b>	---	---	---	Internal	External	External	External
<b>Cable (length, type)</b>	---	---	---	4 ft. - 50/25 Pin	3 ft. - 50/25 Pin	3 ft. - 50/25 Pin	3 ft. - 50/25 Pin
<b>Warranty</b>	2 Year	2 Year	2 Year	2 Year	1 Year	1 Year	1 Year
<b>Software Bundled</b>	Dolphin Install, Includes Bracket & Cables	Dolphin Install, Includes Bracket & Cables	Dolphin Install, Includes Bracket & Cables	Dolphin Install, 7 MB Public Domain & Shareware	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer	Turbo Cache, Turbo Spool, Turbo Backup, Turbo Optimizer



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## RATING RADIATION SCREENS



Like many appliances, computer monitors generate electromagnetic emissions. The combination antiglare-antiradiation screens on the market may seem like an obvious solution. But it's not quite that simple.

As explained in the feature article "The Magnetic-Field Menace," standard monitors generate low-level electromagnetic emissions that have two components, electric and magnetic. Generally, the low-level *electric* field emitted by monitors is easy to block, while blocking the low-level *magnetic* field is quite difficult. *Macworld* tested six antiglare screens from four companies and discovered an average reduction of 95 percent of the electrical emissions when the screens were grounded. But there was no significant reduction of low-level magnetic-field effects by any of these screens. (The measurements have a tolerance of about 5 percent.)

These screens *do* reduce a user's exposure to the electric field. And because electromagnetic hazards represent mostly uncharted terrain for scientists, no one can say with certainty that electric-field emissions are harmless. But blocking the electric field isn't enough. Louis Slesin, editor of the bimonthly *VDT News*, points out that scientists investigating health concerns, such as links to miscarriages, aren't concentrating on electric-field research. "Smart money says it's a low-frequency-magnetic-field problem and screens don't take care of the magnetic field," says Slesin.

*Macworld* used a Holaday Industries HI-3600 VDT Radiation Survey Meter to test a Macintosh SE/30 and Macintosh IIfx for baseline emissions. Then we retested the same machines with antiglare screens. We measured emissions from the Maccessories SE Anti-Glare Filter from Kensington, the SE and Mac II versions of the dB60 Video Display Radiation/Glare Shield from NoRad, the Glare/Guard Professional and Glare/Guard Profile Plus

from Optical Coating Laboratory, and a Sunflex screen from Anacom.

**CLAIMS DIFFER** In our tests all these screens offered similar performance in terms of electromagnetic emission shielding, but what they promised on the packaging varied widely. Optical Coating Laboratory is quite modest in its packaging, for example, saying only that Glare/Guard Professional has static control features—and so it does.

The back of Kensington's packaging offers the following statement: "All computers emit potentially harmful electromagnetic radiation through their screens. The Maccessories SE Anti-Glare Filter prevents these non-ionizing VLF/ELF emissions from passing through." That is not entirely true, according to our testing. The filter blocks almost all very-low-frequency (VLF) and extremely-low-frequency (ELF) electric-field emissions, but it does not affect magnetic VLF/ELF emissions at all.

NoRad's packaging claims only that the dB60 blocks radiation, which is also partly true. Just as with the Kensington product, the filter blocks low-level electric-field emissions but provides no protection against magnetic emissions. The radiation shield information sheet inside the box is more specific, explaining that more than 99.99 percent of the electric-field radiation is blocked across a wide spectrum. That's true, but can be misleading since the magnetic field, which is not affected by NoRad's product, is not mentioned at all.

Buying an antiglare screen makes sense if you have a glare problem. Buying a screen that also blocks a monitor's electric field may be wise for people who suffer from allergies, wear contacts, or are especially sensitive to their environment. As we sit at a computer, its static electric field can push microscopic particles into our faces, bombarding us with dust and other contaminants. A grounded screen stops the particle bombardment.

**ALTERNATIVES** There aren't many alternatives to screens at the

moment, and none of them are inexpensive. Safe Computing of Needham, Massachusetts, manufactures a Mac-compatible \$1395 liquid-crystal display (LCD) that our tests confirm generates virtually no emissions. (Alas, the screen display quality is no match for a conventional monitor.) Generally magnetic-field emissions aren't an issue with LCDs, plasma displays, or displays that use light-emitting diodes (see "Cathode-Ray Tubes Explained," page 139).

By now, Sigma Designs of Fremont, California (415/770-0100), should be offering monochrome monitors that meet Swedish standards for VLF emissions (prices start at \$1699). In April, MegaGraphics of Camarillo, California (805/484-3799), announced its intention to create a Defender line of monochrome monitors. According to CEO Diane Scott, the company is working with Swedish standards to shield all sides of the monitors for reduced electromagnetic emissions. (That's an important feature, because the strongest electromagnetic emissions are generated at the back and sides of a monitor.) And virtually all of the antiglare-screen companies I spoke to are either working on or considering additional products that block low-level magnetic emissions.

**RESOURCES** The Labor Occupational Health Program (LOHP) at the University of California at Berkeley has a library that covers a broad array of occupations and hazards, including computers. On your request, the program will send you a 5-page packet on VDT radiation or on general VDT information. Both packets include information about the program and its services. The program's staff will also help you with telephone queries. Contact the LOHP at 2521 Channing Way, Berkeley, CA 94720; 415/642-5507.

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## SERVICE HERO

**C**entral Point Software receives praise this month from L. Kevin Kastens of Bloomington, Indiana. Recently he ordered MacTools Deluxe from the company, which decided to postpone the shipping date while it added some new capabilities to the program.

A few weeks after Kastens placed his order, he received a letter from Central Point explaining the delay. "It is their policy to hold all checks until the product has been shipped," writes Kastens. "However, they inadvertently deposited my check ahead of time. Because of this, they sent me a reimbursement check and promised to send me a free copy of MacTools Deluxe as soon as it is available. All this without a phone call or letter from me."

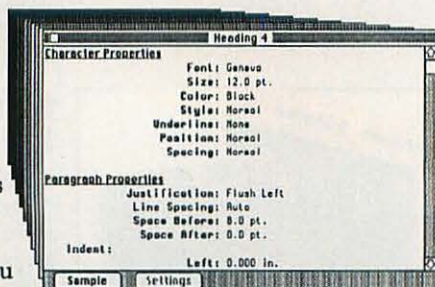
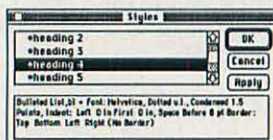
This satisfied reader says that in his six years of Apple II and Macintosh experience, Central Point Software has been the one company that consistently attempts to keep him informed of improvements and upgrades.

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recliner or sofa. The Incliner is basically a wooden computer stand on wheels. It has a swing-out keyboard stand, swing-out mouse pad, and adjustable height. There's no room for a coffee cup, but you can add a printer to the lower shelf.

**Accessories** Several of the antiglare brigade also make other Mac accessories. Kensington Microware offers tilt-and-swivel stands, and Anacom sells a wrist rest for \$39.95.

Individual needs and comfort levels vary so much that it's important to try out any ergonomic item you intend to buy. Just because it's labeled ergonomic doesn't mean you'll like it. If you can't try out the product in a showroom, see if there's a money-back guarantee or return policy. (And please, pay by credit card, not check, if you buy by mail.)

A growing number of consultants  
(continues)



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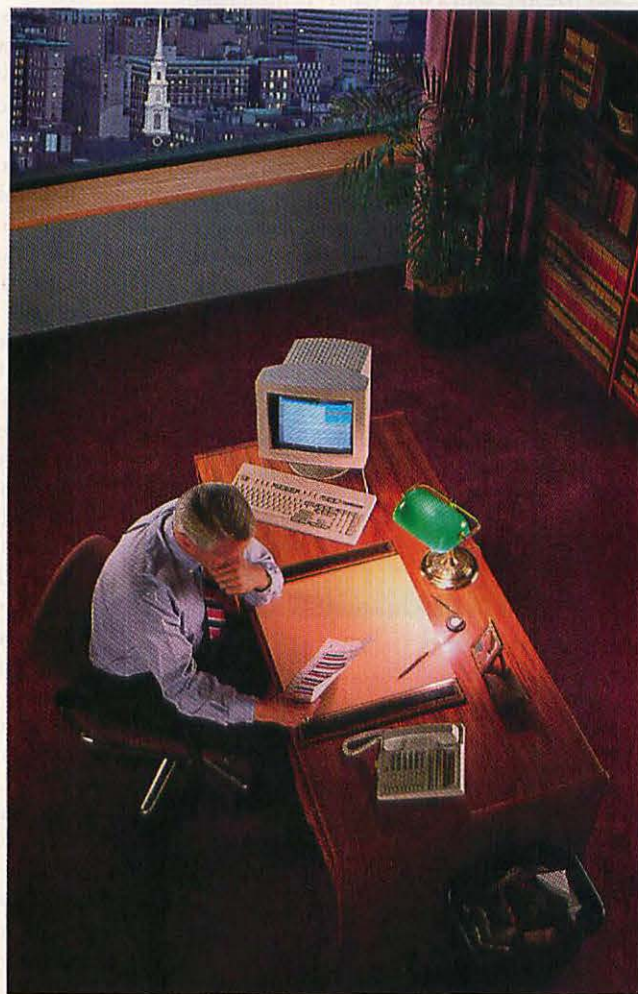
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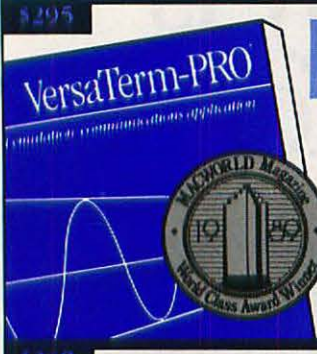
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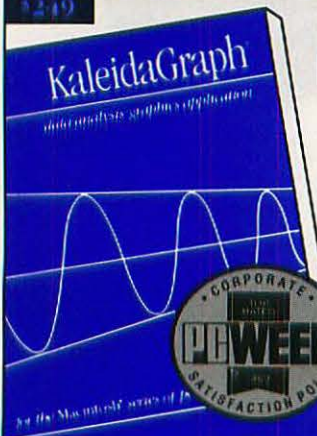
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call themselves ergonomics experts, but some are just well-read salespeople peddling products. At a minimum, consultants should be members of the Human Factors Society, according to Lueder, who has an M.S. in Human Factors Engineering. The Human Factors Society (213/394-1811), located in Santa Monica, California, requires that members have demonstrated experience in human factors (an older term for ergonomics). The society publishes a membership directory that can help you locate an individual with the experience and expertise you want. Most large university libraries should have copies of the directory. Or you can order a copy for \$30.

In the midst of Silicon Valley, it's easy to believe that the 18-hour day is a necessity and the expensive office chair is a luxury. Easy to believe, that is, until the headaches start, or the lower-back pain, or another unexpected problem. "If people spend more than four hours a day working on the computer, the incidence of physical discomfort increases dramatically," says Lueder. Don't wait until there's pain to treat yourself right. You deserve comfortable computing now. We all do.

#### Crate Goes Under

Hard disk drive company Crate Technology is out of business (see *Mac Bulletin*). If you returned your drive to Crate for repairs, immediately write to Jerry Rapoport, Trustee, 16633 Ventura Blvd., Ste. 600, Encino, CA 91436. Tell him when you sent your drive to Crate and its serial number. Document your ownership if possible. People who bought drives from Crate but did not receive them should file a proof-of-claim form with the U.S. Bankruptcy Court, 312 North Spring St., Los Angeles, CA 90012. The case number is LA-89-17452-AG. For more information, call 415/978-3149 for a recorded update. **M**

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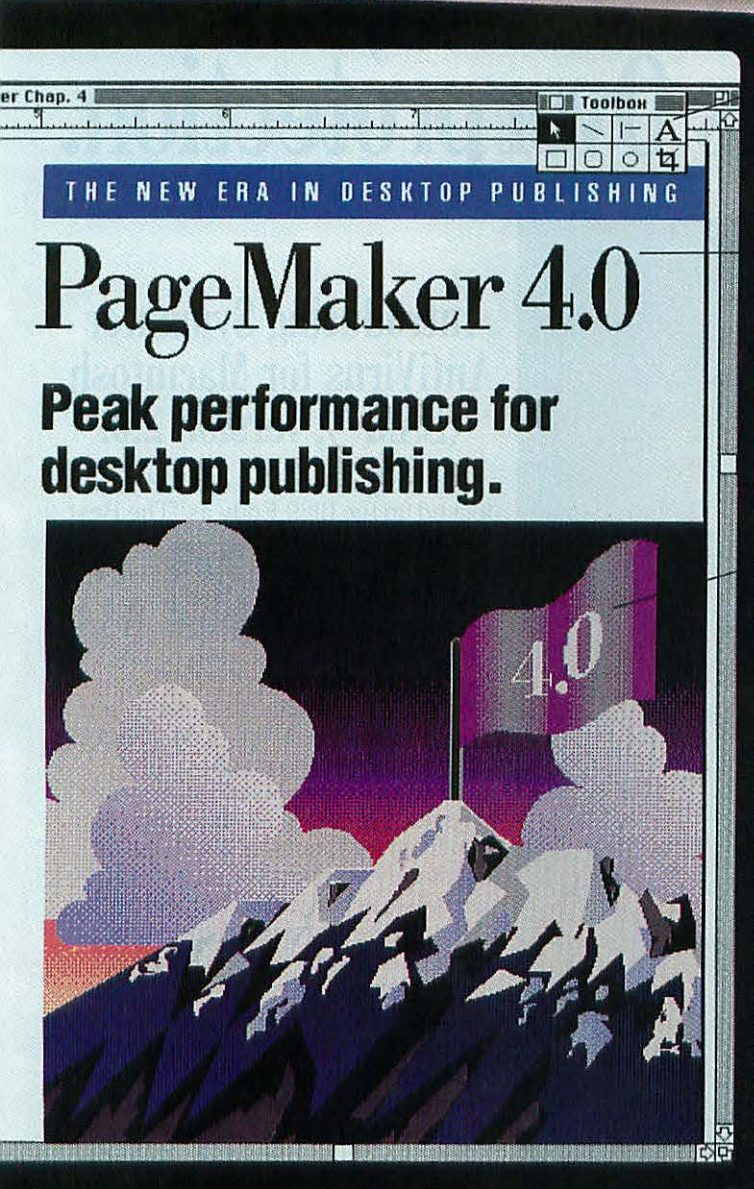
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# I Want My DTV!

DESKTOP VIDEO IS COMING TO THE MAC—BUT CAN ANYONE AFFORD IT?

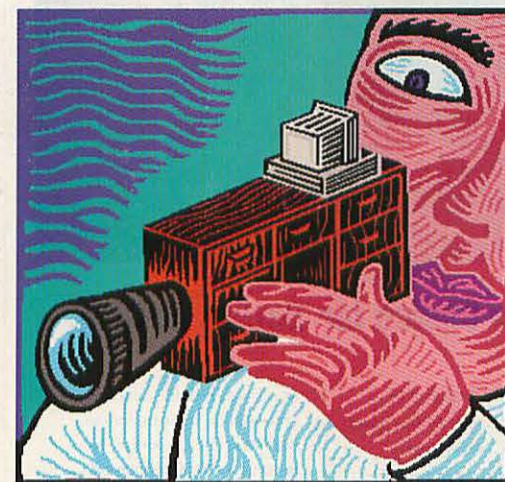
BY BRUCE F. WEBSTER

Desktop video is in danger of becoming passé before it becomes a real industry. That's due partly to how long the term's been around and partly to the widespread use and abuse of the phrase *desktop publishing*, which threatens to

become as meaningless in the '90s as *user-friendly* and *integrated* became in the '80s. But mostly it's due to the high price of admission and the low level of demand.

All you need for desktop publishing is a Mac and a printer, or even just a Mac; nowadays you can always run down to the local copy shop to print out a newsletter. Video, though, is a more expensive pastime. Even at consumer levels, a simple outfit—a camcorder, a couple of VCRs, a nice monitor—will set you back a few thousand dollars (at least), and quality will be low. And there aren't corner video shops, ready to drop in your special effects and synchronize your sound tracks at cut-rate prices. Decent (that is, professional) equipment will set you back 10 to 50 times that amount, and you can spend a lot more if you want to get really fancy.

Desktop publishing fills a certain need: to make people feel that their work looks good and that what they have to say is important. (Whether or not it aids communication is open to debate—I smell a future column—but it does keep people happy and feeling productive and creative.) The need for desktop video is less apparent, even at first glance: People's standards for



SCOTT BALDWIN

video are higher, their ability to use it is lower, and equipment demands are greater. And though some graphic designers might take issue with this, it's far easier to make a wretched video than a wretched newsletter.

Does all this mean that desktop video is a chimerical market, too small a pie to feed all the companies waiting to dig in? Well, yes and no. DTV is a real market right now, albeit a limited one. There are people working with video who want or need more effective and direct ways of manipulating images collected on tape and film.

They range from professional filmmakers to at-home camcorder-and-VCR enthusiasts. Such a broad sweep of requirements, technologies, and budgets breaks up the market into a number of relatively small niches.

At the moment, video technology is poised on the brink of a set of major advancements. In some respects, video technology has remained rather archaic (and arcane) for quite a few years. But several simultaneous and parallel developments may cause a real video revolution in the next several years, affecting not only the professionals but also the corporate and consumer users. These same developments are largely responsible for the emergence of desktop video; let's look at some of them.

## Waves Shift to Bits

The one development that's a breakthrough for DTV is the move from analog video to digital video. Traditional video deals with analog signals, fluctuating electromagnetic waves that are captured and stored as patterns on magnetic tape. Manipulating and combining these signals is a tricky art, done with complex equipment run only by trained technicians. And costs for the technicians and the equipment usually involve large dollar amounts. (continues)



Then video folks discovered that you can digitize a video signal by taking a single frame—or even a single scan line—of analog video and converting it to a set of numerical values. This allowed an entirely new class of video effects, such as the rotating video frame (with an active video feed inside) so beloved of local newscasts.

The move to digital also involved

a move toward computer control of this equipment. Digital editing requires digital storage, so serial and parallel interfaces started showing up on high-end video equipment. This made it possible to store digital images onto traditional high-capacity storage devices, such as magnetic tape and very large hard disks.

DTV is possible because of the

rapid advances in personal- and workstation-computer technology. Prices for storage and processor power have been dropping steadily (excepting, of course, the DRAM roller coaster). Graphics technology has been rapidly advancing while becoming cheaper. User interfaces have become more sophisticated and easier to use.

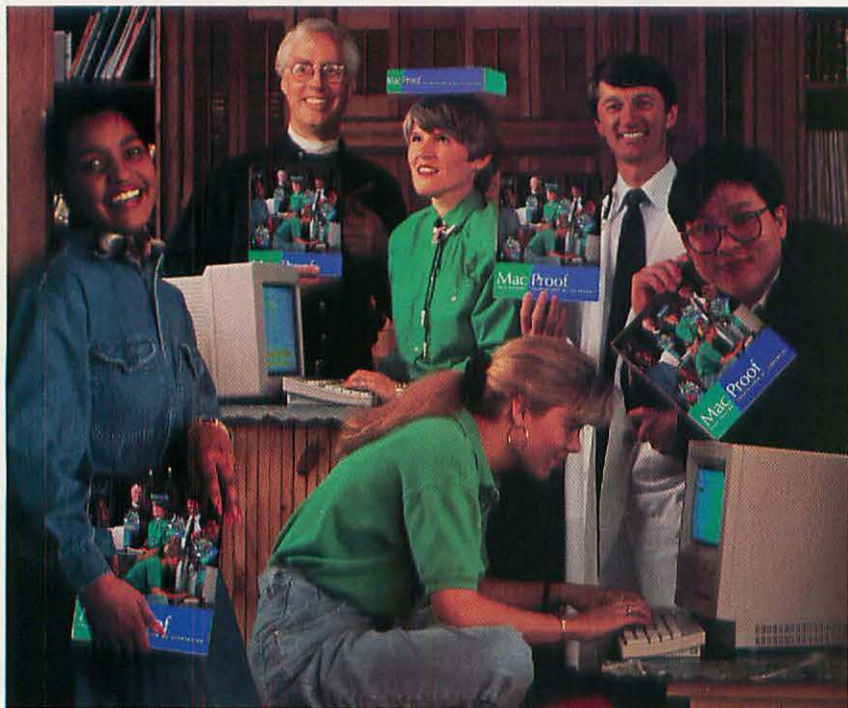
These hardware and software advances have made it possible to use personal computers to direct high-end video equipment and manipulate digital video signals. Hence the recent introduction of several different hardware and software products for the Macintosh, allowing the user to control the editing process and even integrate Mac-generated graphics with external video signals. Let's see what markets there are for desktop video and how a few different firms are addressing them.

#### Professionals Only

There are three potential markets for desktop video: professional, corporate, and consumer. Professionals want to produce high-quality video with high-end equipment without involving a lot of highly paid people. As John North of Interactive Media Technologies of Scottsdale, Arizona (602/443-3093), puts it, "It doesn't have to be as hard to do as the technicians in that industry would have you believe."

IMT's own effort to ease the process is the IMTX 8000, a box designed to replace both expensive technicians and expensive equipment. (See *Macworld News* for full details.) Not that the IMTX 8000 and its associated plug-in cards are cheap: a standard configuration, with audio and video crosspoints as well as four controller boards, will cost around \$10,000. But IMT's hope is that the IMTX 8000's open architecture, flexibility, and ease of use will result in significant savings of both time and money.

A high-end DTV product, one that's gotten a lot of attention, is the Avid/1 Media Composer, a digital video editing system from Avid Technology of Burlington, Massachusetts (617/221-6789). Since prices for various configurations range from \$60,000 to \$85,000, you could question whether this is really desktop video. But since (continues)



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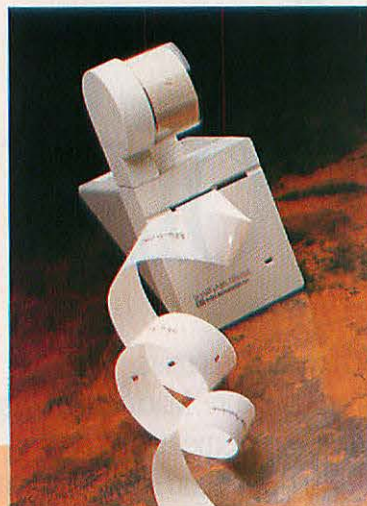
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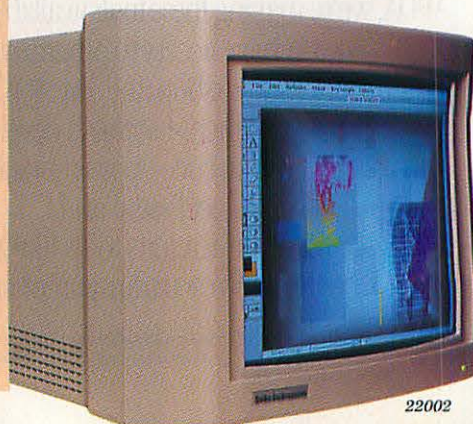
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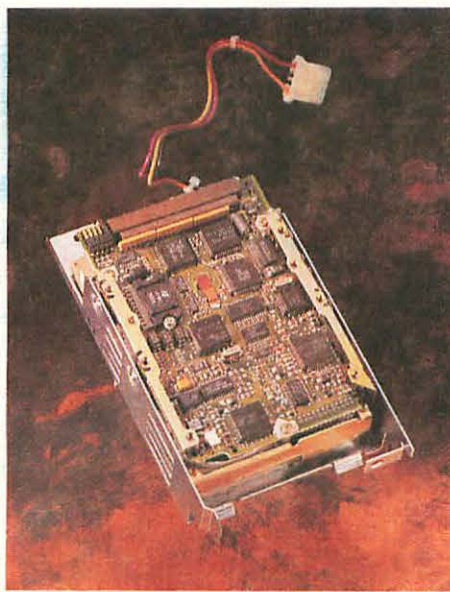
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the system—which comprises a Mac IIx, two monitors, two or more tape decks, and a number of external disk drives—fits on a desk and runs in the standard Mac environment, perhaps desktop video is as appropriate a description as any. The Avid/1 lets you do frame-by-frame sequencing and splicing using images captured off source tapes at 30 frames per second. These frames are stored in highly compressed form and so suffer a loss in quality when viewed on the Mac. However, once you are done, the Avid/1 software then performs direct tape-to-tape editing, composing a professional-quality version of the sequence.

At the other extreme, a company called Sundance in Irving, Texas (214/550-8338), makes a product for professional use that's definitely desktop video. Called the Quicksilver Video/Disk Editing System, it lets you use anything from a Mac Plus to a IIx to do "almost real-time editing" (the company's phrase) of video from up to 15 sources, controlling any video

equipment with a serial interface. The software costs \$3950; the controlling box, another \$1395. Those are low prices even by Macintosh video standards, where it's easy to drop \$9000 for a 19-inch, 24-bit color display (monitor and card).

#### Pin-striped Video

Desktop video for corporate use generally falls under the broad heading of multimedia (a term with more energy than coherence). At least, that's the hope of the manufacturers, since there is far more press, attention, and venture capital being given to multimedia than to desktop video.

Corporate Macintosh products generally mix an external video signal (from professional tape, broadcast video, or a VCR) with Mac-generated images. The goal is to record the combined video images for later use. The main obstacle for Mac-based multimedia has been transforming the Mac's noninterlaced RGB video into the professional broadcasting standard, an

NTSC-compatible (composite) interlaced signal.

Some of the DTV products aimed at this market include the ColorSpace III and ColorSpace FX, from Mass Microsystems (408/522-1200); the ColorCapture Videographics 2.0, from Data Translation (508/481-3700); the ColorBoard 364, from RasterOps (408/562-4200); and the MicroTV and DigiVideo boards, from Aapps (408/735-8550). Let's look at a few of these.

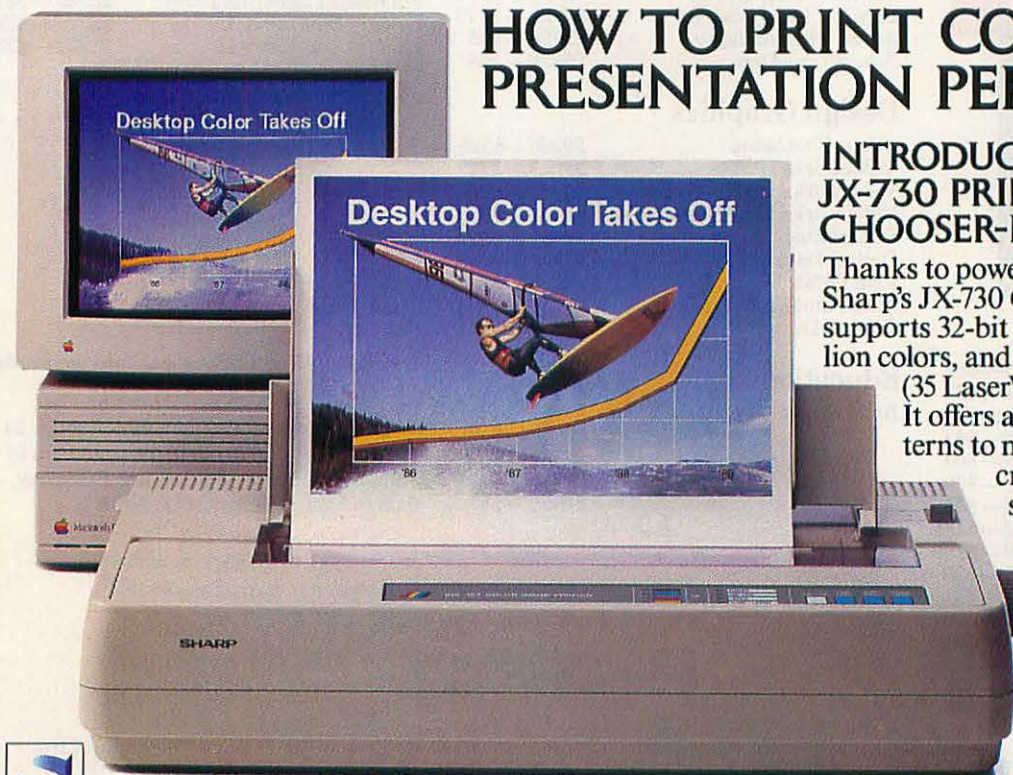
These boards all have the same basic function—mixing Mac and external video—but their features and prices differ. The MicroTV board enables you to view an external video source in real time within a 128-by-128-pixel window on a Macintosh display; the DigiVideo board adds color support and expands the window size to 256 by 256 pixels. There's also a developer's kit that lets you use HyperCard, SuperCard, C, or Pascal to control the MicroTV and DigiVideo boards. The prices are within consumer range, (continues)

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If you're new to the Macintosh word processing market you probably want a word processor that is easy to use. If you've been around for a while, you undoubtedly want a powerful word processor. Chances are you have tried either MacWrite or Microsoft® Word 4.0.

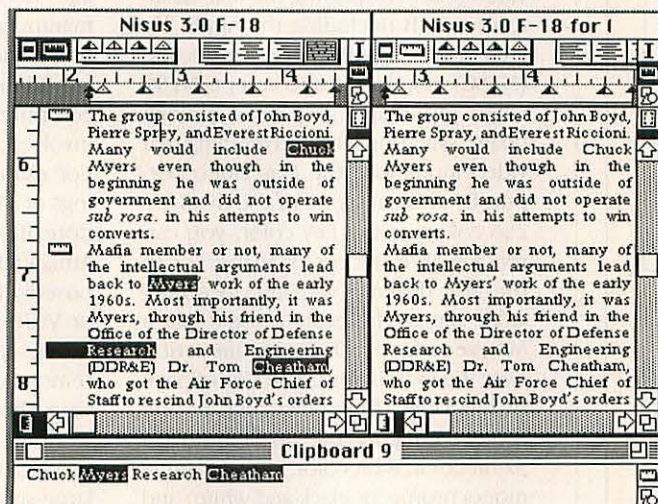
One is easy to use, the other offers power. Both, however, have severe limitations which is why we developed Nisus in the first place. Here with abject brevity are just a few of the reasons we know you'll find Nisus 3.0 easy to use with all the power you'll ever want.

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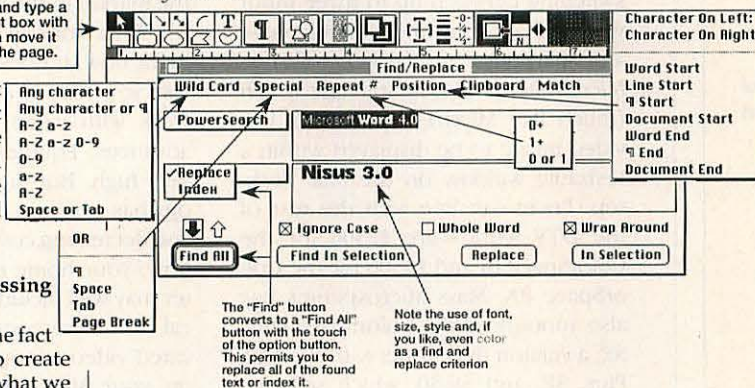
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Nisus 3.0 will let you find any text, style, size, or color in any



The automatic file comparison above sent the cursor directly to the first instance where the files differed, which in this case was *Sprey* versus *Spray*. Note the noncontiguous text selection works even in any of the 10 editable clipboards. (Note the vertical ruler on the left which allows you to keep track of where you are.)



The "Find" button converts to a "Find All" button with the touch of the option button. This permits you to replace all of the found text or index it.

Note the use of font, size, style and, if you like, even color as a find and replace criterion

combination. But even more powerful is its ability to find every word in a document at once even in unopened files. For example, suppose you want to index a book where the subject is Ben Franklin. With Word 4.0, you'd have to open each file, go to each instance of Ben Franklin, and index them one by one. With Nisus 3.0 you simply find all Ben Franklins—even in unopened files—and instead of selecting *replace*, you select *index*. Think of the time savings on a long document.

## Noncontiguous text selection

Thoughts don't always come in the order you want. Some-

times you type a nugget here and a valued phrase there. So why should you have to select text as though you were a perfect serial thinker. Nisus 3.0's noncontiguous text selection permits you to collect your thoughts on your random walk through the text and bring them all together on one of 10 editable clipboards.

The table above is a brief summary of some of the features that make Nisus 3.0 the most powerful yet easiest to use word processor. Discover why Nisus is shipped with every Macintosh in Korea, why MacUser U.K. named Nisus "1989 Best Word Processor," and why MacWorld Australia uses Nisus as its word processor of choice.

## Nisus 3.0 and Word 4.0 Feature Comparison

	Nisus 3.0	Word 4.0
Built-in word processing language	■	
Noncontiguous text selection	■	
Mix column formats	■	
Find all and replace or index	■	
Find any font, style, size, or color	■	
Place text or graphic linked to parent text or graphic file	■	
Find and replace in open or unopened files	■	
Cross-reference text	■	
125,000+ user definable key commands	■	
"Super Style sheets" down to character level	■	
Automatic File Comparison	■	
10 editable clipboards	■	
Mark text as electronic book mark	■	
Built-in Graphics	■	
Rotate text and graphics	■	
Unlimited undos back to "open file"	■	
Reads & Writes Microsoft Word Files	■	■
Vertical Ruler	■	

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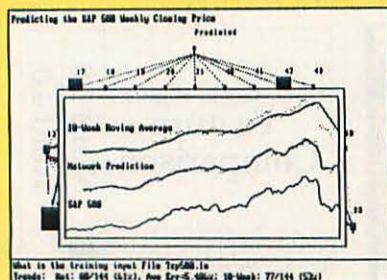
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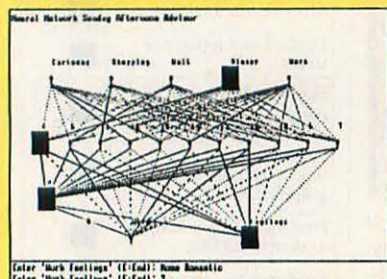
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too: the MicroTV board costs \$395, the DigiVideo upgrade costs \$200, and the developer's kit is just \$15.

The ColorSpace Ili/FX system from Mass Microsystems costs a lot more and does a lot more. The ColorSpace Ili board acts as a regular 8-bit color video board, displaying the Mac desktop on RGB (including the Apple 13-inch RGB monitor) or composite (NTSC) monitors. It also accepts NTSC video input and acts as a genlock board, synchronizing and merging that video input with the Mac video output. By choosing one of the display's 256 colors as the key color, you can replace all instances of that color in the Mac desktop with the incoming video signal. This enables you to place Mac-generated titles and animation over the video input. The ColorSpace Ili has other functions, such as the ability to digitize the video input (in 32-bit color, 8-bit color, color-channel monochrome, or black and white) and save the resulting image as a PICT2 file. And the ColorSpace FX board (which works with the ColorSpace Ili) adds yet more functionality, such as switching between up to three input video signals, adjustment of hue phase and sharpness, and support of Mass Microsystems' MacTV software which (much like MicroTV) permits a live video image to be displayed within a resizable window on the Mac desktop. Prices—in line with the rest of the DTV world—are \$2300 for the ColorSpace Ili and \$3500 for the ColorSpace FX. Mass Microsystems has also announced the ColorSpace Plus/SE, a version that works with the Mac Plus, SE, and SE/30, which sells for just \$1895, plus another \$100 for a Plus- or SE-specific video adapter.

## Video for the Masses

Multimedia aside, will a true consumer market for desktop video ever emerge? Perhaps surprisingly, the answer appears to be yes.

Like DTP, consumer audio/video has advanced in the last decade and will change even more dramatically in the next ten years. For example, the FCC is currently deciding when high-definition television (HDTV) broadcasts will begin and which format will be used. The analog-to-digital shift is showing up more and more in con-

sumer products: compact disks, digital audio tape (DAT), digital cameras. Having achieved a high standard of signal quality, manufacturers of consumer products seek to differentiate themselves by adding features and functionality. By the end of the decade, home video may be as easy to manipulate, edit, and customize as home audio is now.

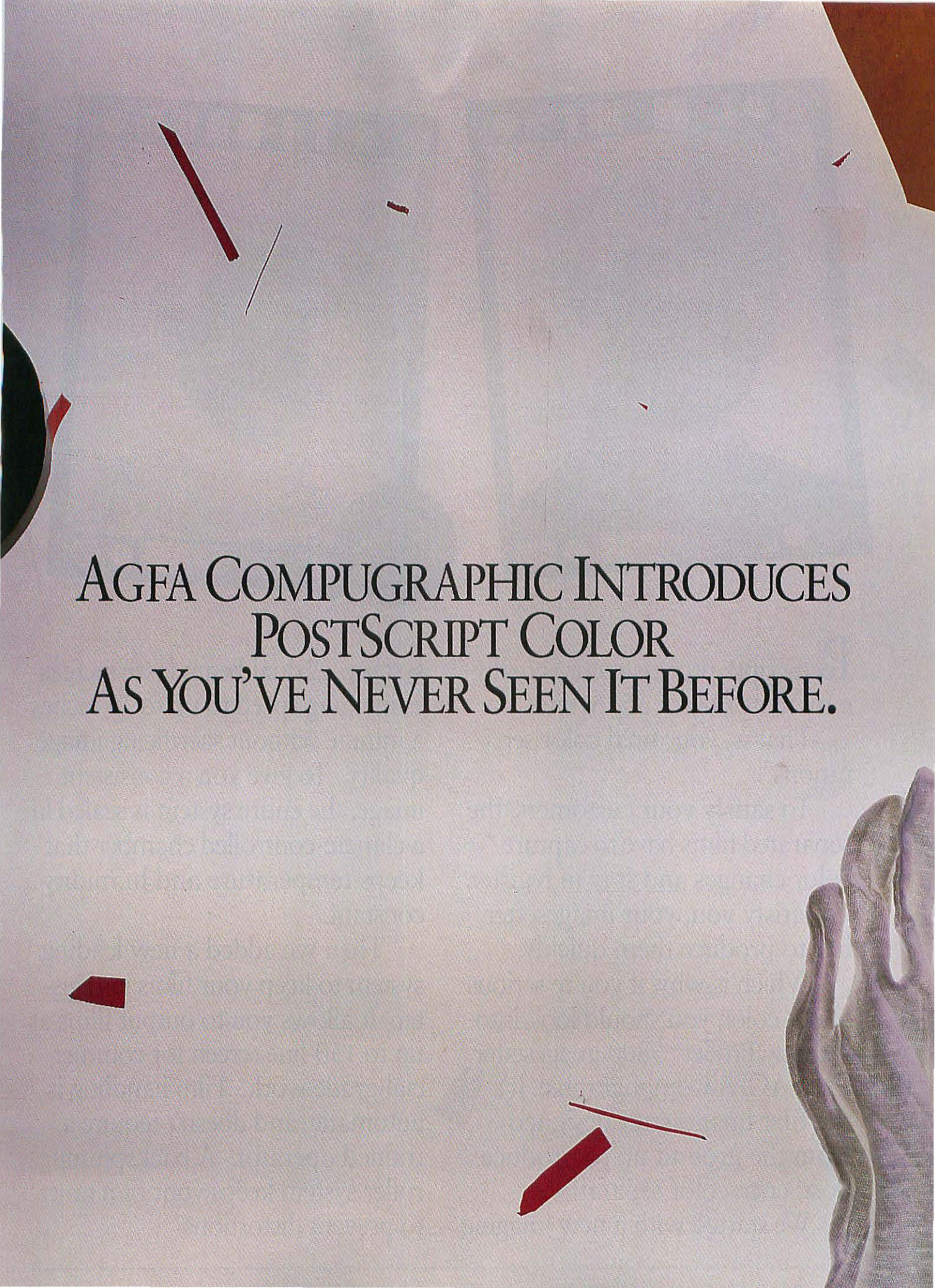
When that happens, personal computer technology will be heavily involved, possibly in unexpected ways. For example, there have been sightings of a CD ROM drive from Commodore Business Machines that has an Amiga 500 built into it. The unit supposedly looks like a standard stereo or VCR component and has no keyboard—just an infrared port for a remote control and a joystick. Likewise, there's a group in Silicon Valley working on a high-end consumer product that has been described as a large-screen TV with the equivalent of a Sun Sparcstation built in. And, of course, the color video-compression technology mentioned here in the April 1990 issue will be migrating into the market in the next few years.

What does all this mean for you? Right now, it doesn't mean a lot, unless you have a compelling need to work with video; even with all the advances, equipment costs are still very high. But digital-based technology has a history of increasing power and decreasing costs. Some years from now, your home entertainment center may well include a read-write optical disk drive controlled by sophisticated video-editing software running on your Mac IIx home computer (assuming Apple ever starts making a home version of the Macintosh II, but that's yet another column). Or it may be that DTV will remain a relatively expensive niche market, of interest primarily to producers and film editors. However it develops, though, video will never look quite the same again.

It'll look better. ■

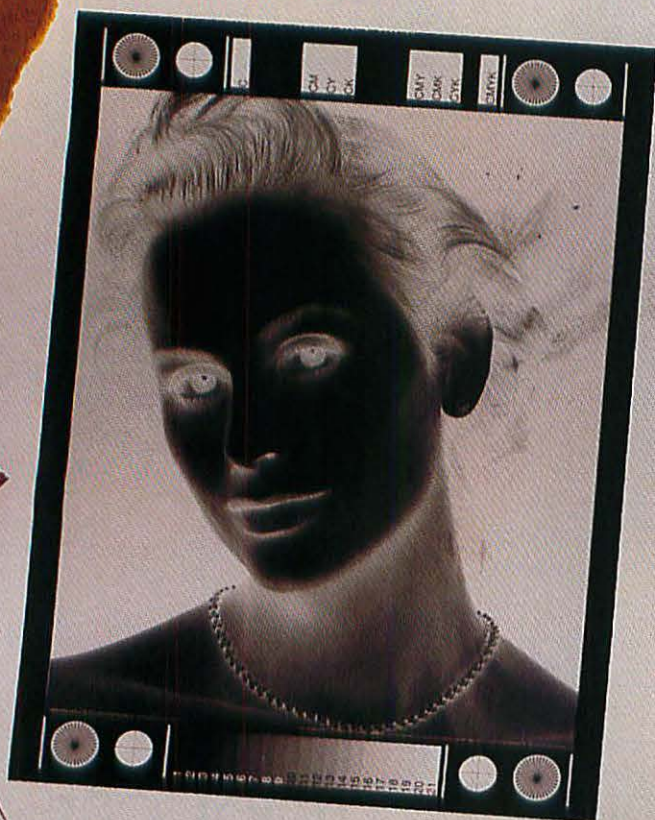
*Contributing editor Bruce F. Webster is project manager at San Diego-based LaserGo. He can be reached on BIX (as bwebster) and on MCI Mail (as Bruce Webster).*



The background is a light, textured surface. It features several abstract elements: a large black semi-circle on the left edge; a red diagonal line in the upper left; a small red horizontal line in the upper center; a red diagonal line in the lower center; a red horizontal line in the lower right; and a realistic illustration of a hand with fingers spread in the bottom right corner.

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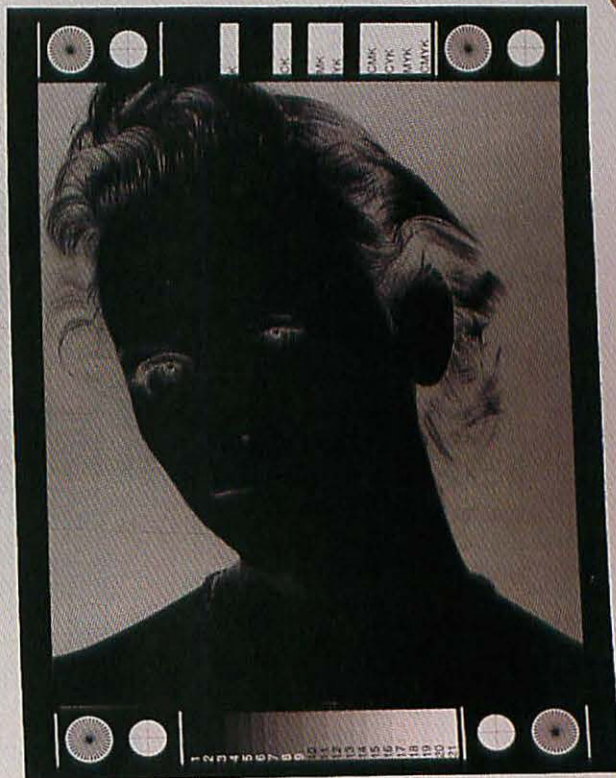
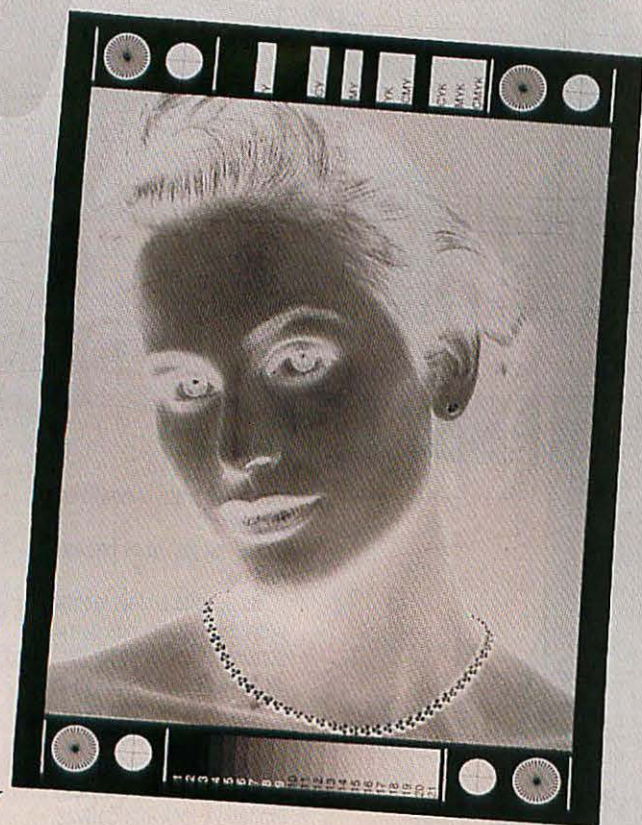
Which is why, if you're serious about color, you should look into the new ProSet™ 9800 imagesetter from AGFA Compugraphic. It's the first imagesetter designed from the ground up to produce PostScript color separations.

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PostScript process color is the next logical step, and ProSet 9800 is the imagesetter designed to do it justice. For more information, or to arrange a demonstration, call 1-800-227-2780 (in Canada call 1-800-387-9533), ext. 9800.

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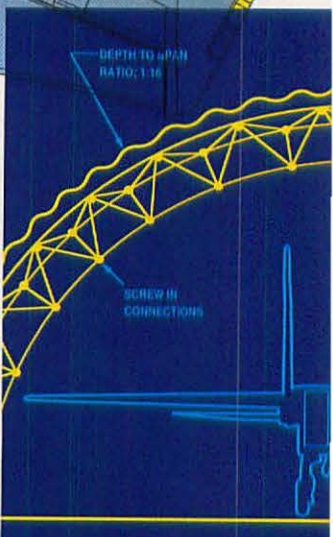
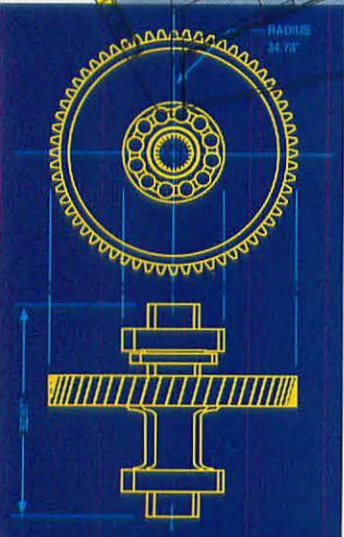
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# MACWORLD NEWS

by Dan Littman and Tom Moran

## HyperCard 2.0 Happens at Last



HyperCard aficionados anxiously awaiting version 2.0 will not be disappointed. Among the many long-awaited features are variable card sizes (from 64 by 64 pixels to 1280 by 1280); a speed increase of up to 16 times over version 1.0; multiple text styles in a single field; "hot" text that lets you assign scripts to any word or group of words, even in scrolling fields; and greatly improved reporting and printing. And Apple says all this still runs on a 1MB machine, even if you take advantage of HyperCard 2.0's ability to open multiple stacks.

What's still missing? Object-oriented drawing tools and full-color graphics support. You can display gray-scale or color PICT images though you can't edit them in HyperCard (a third-party product may let you do this in the near future). Gray-scale and color PICT images can, however, pass mouse clicks, so you can create buttons behind them. Paint effects for bitmapped images now include rotate, slant, skew, and perspective.

Enhancements to HyperTalk include greater speed (stacks compile in memory as they run, though you can't save the compiled code) and background processing under Multi-Finder. Stacks can access resources such as fonts, icons, and sounds stored in other stacks, so programmers no longer need to duplicate resources. Menus are completely customizable and a new Icon Editor lets you easily create your own icons. New visual effects include shrink and stretch transitions and—Mac II users take note—you no longer need to turn off color



The HyperCard 2.0 team (clockwise from floor): Edwin Rosenzweig, Steve Maller, Kevin Calhoun, David Minor, Dan Winkler, Martin Gannholm. Bill Atkinson and many others not shown.

to see them. Programmers can also mark cards using Boolean logic for easier grouping and retrieval.

The Script Editor lets you undo, find, and replace within scripts, and import and export scripts between stacks; you can also open more than one script at a time to cut and paste between scripts. And HyperCard 2.0 includes an extended XCMD interface and impressive debugging tools.

New security measures include scrambled passwords and the ability to prevent users from exiting a stack or peeking at buttons.

Apple will bundle HyperCard 2.0 with all Macs, and dealers will sell it for \$49.95.—Suzanne Stefanac

## Combination Optical Mouse/Scanner Sews Up Images



Mouse Systems Corporation has announced the PageBrush, a device that is a combination of an optical mouse and a hand-held gray-scale scanner and that works with the Mac II series. Designed to automatically "stitch" the narrow strips of a scanned image into documents as big as 9 feet by 9 feet, the PageBrush also functions as a mouse in the usual way.

To achieve the autostitching, (continues)



# BACKUP

## Breakthrough...

### 155 MB SCSI Tape Backup System for the Price of 60 MB!

The MicroPak 155 MB Tape Backup System is remarkable. It can stream at 5 MB per minute. It is small enough to be shared. It retails for less than \$1,000.

Think about it. How much is your data worth? Can you afford to recreate files? An MBT-155 Tape Backup System is an effective way to prevent data loss.

Our tape utility software is easy to use and allows for file-by-file backup and recovery, as well as, mirror image and incremental backup and restore.

The power requirements of the MPT-155 are low. It is designed so that it can safely use the battery of the Macintosh Portable.

MicroNet offers a wide range of Macintosh streaming tape backup systems and hard disk drives that are designed to fit the needs of the entry level user to that of a network manager.

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Mouse Systems built in two optical position-sensing devices, one of which alone would normally constitute the workings of an optical mouse. During scanning, the two sensors read positioning information from a transparent overlay that you place on top of an image or document. Then the PageBrush software compares the scanned swaths of the image, eliminates duplicated parts, and stitches the edges together seamlessly, according to the company.

Users can scan in part of an image, change the brightness and contrast of that part in software, and then scan and manipulate other parts of the image separately. The size of the image that can be created depends on available memory and on the size of the transparent overlay.

The PageBrush produces 64 shades of gray. It is scheduled to ship in September at a list price of \$795, including its NuBus controller board.

The company has also announced The Little Mouse, an optical mouse that's 28 percent smaller and 38 percent lighter than most. The Little Mouse offers 300-dpi resolution and requires no cleaning. It has a suggested list price of \$129.95 and should begin shipping in June. For more information, call Mouse Systems in Fremont, California, at 415/656-1117.—T.M.



**The PageBrush:** It's a hand-held scanner and a pointing device.  
**The Little Mouse (right)** is a small optical mouse.

required for other machines to read from and write to Macs).

Apple had briefed the press and planned to introduce its NFS client implementation in June 1989, but pulled it just weeks before the public announcement. Apple won't talk about its "unannounced products," but an Apple spokeswoman did say the company is still committed to NFS and should have it available within 12 months.

Meanwhile, third-party connectivity vendors such as TOPS and Cayman Systems (whose GatorBox does provide Mac users with indirect access to NFS files) seem loathe to bring out NFS client products of their own. "Why

should someone start writing NFS today when they believe Apple may release a product tomorrow?" says Peter Honeyman of the University of Michigan's Center for Information Technology Integration, which developed the unannounced NFS client for Apple. "Everybody knows Apple's sitting on this product. They've seen it run; they know it works."

Implementing NFS on the Mac is difficult because the Mac's file structure and filing system are so different from those of most computers. For example, no other computer uses the Mac's icons and desktop, its resource-and-data-fork structure, or its type-and-creator filing system; most other computers don't permit spaces and nonstandard characters in file names; and the Mac's calendar starts in 1904, while the NFS calendar starts in 1970.

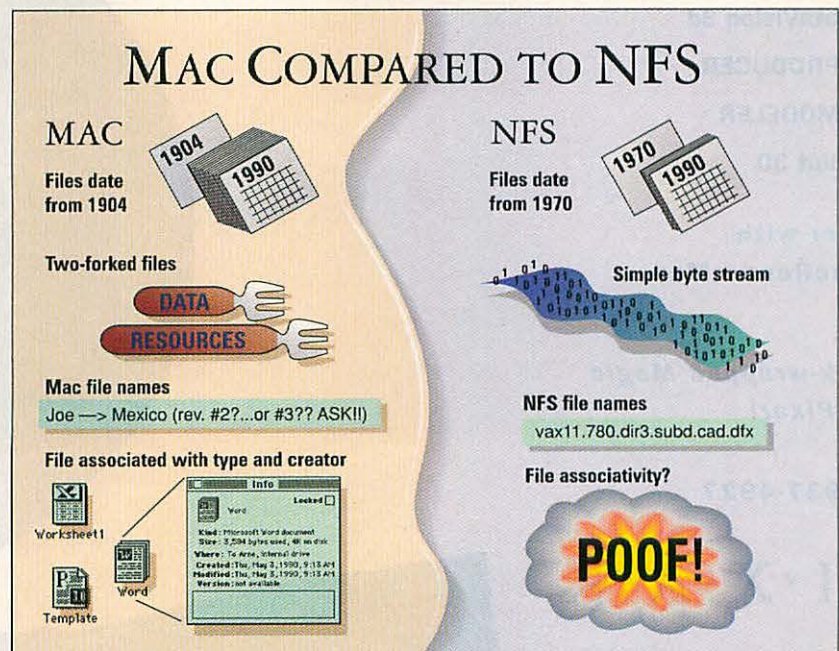
But difficult doesn't mean impossible. The Wollongong Group, known for UNIX connectivity products, is preparing a Mac NFS client implementation and hopes to ship it in August. It will act like AppleShare and make an NFS volume look just like an AppleShare volume. Wollongong is also developing a Mac client for Server Message Block (SMB), a common mainframe file protocol, and plans to develop NFS and SMB server implementation. (continues)

## NFS: Missing Link Found



Users who have been waiting patiently since last year for Apple's client implementation of Network File System (NFS) for the Macintosh may have a product this summer—though not from Apple.

The NFS protocol, which Sun developed and placed in the public domain, allows machines ranging from IBM PCs to mainframes and supercomputers to read each other's files. NFS client support for the Mac would let Macs read from and write to other NFS machines (though an NFS server is



Letting Macintosh files reside on a Network Filing System server is no trivial task, because the two systems use such different conventions for naming and managing files.



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mentations for the Mac as well.

Wollongong expects its MacPath-Way NFS to cost less than \$200 per client. For more information, contact the Wollongong Group in Palo Alto, California, at 415/962-7100.

—Sharon Fisher

## With Switchboard, Flexibility Is the Key Word



DataDesk International's Switchboard is one keyboard that should make even left-handed accountants smile. If you don't like having the numeric keypad on the right, well, you simply unplug it and move it to the left. You can configure the Switchboard by snapping on various keypads, keyboard extensions, a small trackball, and even a module for 3270 terminal emulation. The keyboard supports all Mac models from the Plus up, and on the IBM side it supports XT, AT, and PS/2 systems.

The keyboard ships with a 105-key layout that contains three movable key clusters: the cursor keys, numeric keys, and the alpha keys. Other, add-on modules will be available separately. Add-on modules under development include an AT-style function-key pad; a digitizer with stylus, which will work as a pointing device or as a graphic input device; and a Dvorak-style alpha keypad. (The Dvorak layout arranges the keys so that the most-common letters are easiest to reach—unlike the common

QWERTY layout, which actually was designed to slow down typists so that early mechanical typewriters wouldn't jam.) The company also intends to come out with an Auditor's Module, which will look like a standard accountants' calculator and will be bundled with software that emulates a calculator on the screen.

A microprocessor built into the base of the Switchboard manages its internal serial bus so that each of the modules is completely interchangeable. The Switchboard is slated to begin shipping in May at a suggested retail price of \$239.95. The trackball and vertical function-key modules are also scheduled for May delivery, with Dvorak alpha pad and the 3270 emulation module to follow in June. The digitizing pad and accountants' module are expected in the fall. For more information contact DataDesk in Chatsworth, California, at 818/998-4200, 800/826-5398, or 800/592-9602 in California. —Mary Margaret Lewis

## Voyager's CD AudioStack



Listen up, music fans. You can now use HyperCard to build stacks around interactive control of an audio CD playing on a CD ROM player. In addition to providing the 29 XCMDs and XFCNs that do the hard work, Voyager's CD AudioStack comes with more than 40 prebuilt buttons for such functions as scan, play, pause, and resume; an online manual to all the commands; an in-



STEVEN FALK

Thom Holmes is developing a history of the first century of electronic music.

staller; 24 ideas for using AudioStack's features, complete with scripting examples; and an Event Maker to mark sections of music for use with the CD Play command.

Gene Aitken, at the University of Northern Colorado, and Steve Adams, at the University of Southern California, are using the CD AudioStack to revolutionize ear training. Students normally do ear training by listening to random notes played on a piano or synthesizer. In contrast, Aitken and Adams's ear-training stack lets students listen to great performances and then place the notes they've heard on a staff in HyperCard. Pressing a button compares their work against correct notation and highlights mistakes. Music teachers will be able to customize the stack by incorporating music from any audio CD and providing correct notation for their students.

In another use of the CD AudioStack, Thom Holmes, author of *Electronic and Experimental Music*, is creating an interactive history of electronic music from the early 1900s to 1968. Illustrated with rare audio examples of early electronic instruments, the project will be both a historical archive of the development of electronic music and a guide to the genre's important contributors.

The Voyager Company has also published a CD AudioStack interactive version of Beethoven's Symphony No. 9 that combines music appreciation, theory, and cultural history, and comes with a CD of the symphony (see *Reviews*, June 1990).

The Voyager CD AudioStack sells for \$99.95 and includes a sample CD to practice on. For more information, call The Voyager Company in Los Angeles at 213/451-1383. —Liza Weiman (continues)

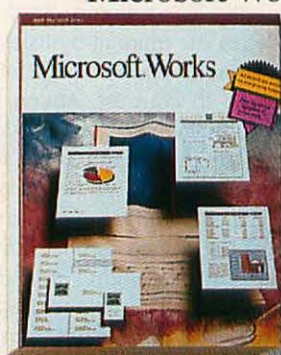


DataDesk International's Switchboard contains a microprocessor-controlled bus so that you can add and move pointing devices, keypad modules, and function keys.



# How do you explain the magnitude of Microsoft Works?

Whether you run a small business or your knowledge about computers happens to be less than monumental, Microsoft® Works 2.0 has you covered.



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Microsoft Works 2.0 is actually five tools in one: word processing, spreadsheet, database, drawing and communications. But as far as you're concerned, it's one integrated program—so it's easy to move between the different productivity tools and use them together.

In fact, from the moment you take it out of the box, Microsoft Works 2.0 is easy to use. It comes with an animated training program written in HyperCard® format. As well as on-line help and unlimited phone support to help answer any questions you may have about Works' features.

No matter how varied your projects are, Microsoft Works 2.0 can handle the job. Its newest feature, the drawing module (with page layout), can take an otherwise dull, fact-filled document and turn it into one full of compelling graphics.

The word processor can create everything from a simple memo to a detailed

report—and it even includes a spell-checker aimed at eliminating typos.

Of course, if your document needs to be supported with numbers, you can always jump over to the spreadsheet to compute and analyze data. And then transform it all into easy-to-read, easy-to-understand charts.

As for information that keeps your business going, the database is indispensable for keeping track of clients and orders.

And you can count on the communications module to bring information to your desktop through a modem.

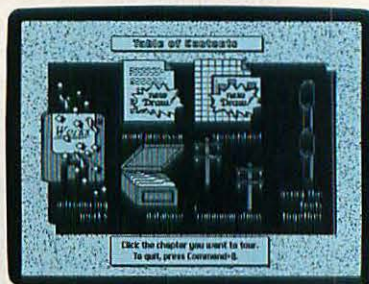
If you'd like to learn more about Microsoft Works 2.0, just call (800) 541-1261, Dept. I76 for the name of your nearest dealer.

No wonder Microsoft Works 2.0 is the best selling application in its class. Aside from being a great value,

Microsoft Works 2.0 is one program that can handle a myriad of business needs.

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# It's simple.

## HOMES REALTY FRONT

Real Estate News for the Greater Aspen Community - Published by Martin Realty

### Lowest Lending Rates Since 1983!

Last week mortgage interest rates reached a five-year all-time low. First Mortgage offered a 30-year, 95 percent new home loan at 8.5 percent with no points. Unheard of in recent years.

Resale of homes has jumped 13 percent over sales recorded during the same period last year.

New Home sales are up 17 percent. Several local lenders have put together special new home financing packages in cooperation with local contractors. Call our Aspen office at (426) 838-2961 for details.

### Crown Construction Opens This Year's Alpine Woods Development

The Alpine Woods development will be open for public tours from July 15 until August 21. Each home represents a distinct style from contemporary to French provincial—all homogeneously placed to create a uniquely attractive neighborhood.



Each home has been fully decorated by a local interior design firm and each is singu-

lar shopping for ideas, we recommend this year's Alpine Woods development.

You can park at the Denny Shopping Center and take a tour bus from there between 9:00 a.m. and 6:00 p.m. daily.

### HOME OF THE MONTH

#### Lakefront Country House: Designed for Entertaining!



This lovely brick and cedar country house can be found just fifteen-minutes from downtown Aspen. Nestled in giant firs, it represents true Colorado style!

The master bedroom suite features a panoramic view of Lake Diamond. The master suite also has his-and-hers walk-in closets, a separate vanity, and a stunning shower area made of glass bricks.

The living room, study, family room, and bedrooms (2+) feature hand-polished redwood panelling and skylights.

The three-car garage has special wall-mounted ski racks and an extra-sized third stall to accommodate up to a 24-foot boat.

Two additional baths, a stone fireplace, 800 square feet of decking, three wooded acres, and a private dock complete this rural dream home.

July 28, 1988

Gary and Lisa Elliot  
533 4th Street  
Denver, CO 80556

Dear Gary and Lisa,

This Saturday, I look forward to showing you a few of the quality homes in the Aspen community.

Per our phone conversations, we will be looking at family homes with a minimum of four bedrooms, two-and-a-half baths, a family room, and a three-car garage. It sounds like you are a pretty active family, so I've also chosen homes with a "mud room" for changing wet boots, etc.

One issue that we haven't really discussed is schools. Before Saturday, you might want to jot down a few priorities. Public, private, parochial? Level needed—from pre-school to college. And any special needs your children may have, like proximity to an indoor pool or gym.

I can also put you in touch with any youth organizations you may be interested in like The Boy Scouts or 4-H. We have it all.

You mentioned wanting a fairly good-sized lot. Does this mean that you will need stables or a barn? I can even put you in touch with a local riding stable if you wish.

Since you plan to be here for the whole weekend, let me know if I can be of any help with hotel reservations or activities. I can arrange for anything from theatre tickets to a riding lesson. Whatever might make your stay more pleasant, and leave a good impression of Aspen.

It's a beautiful place and we're happy that you've decided to make it your home.

Sincerely,

Peter Cohen  
Residential Agent

ccfile



PETER COHEN  
RESIDENTIAL AGENT

472 PINEVIEW DRIVE  
ASPEN, COLORADO 81601  
(303) 838-2961

The Horvath Family  
445 28th Street  
St. Louis, MO 88990

David Doyle  
6767 Diamond Place  
Aspen, CO 84555

The Steffs  
#14 Lamplighter Lane  
Ridgefield, VT 29333

The Horvath Family  
445 28th Street  
St. Louis, MO 88990

David Doyle  
6767 Diamond Place  
Aspen, CO 84555

The Steffs  
#14 Lamplighter Lane  
Ridgefield, VT 29333

The Horvath Family  
445 28th Street  
St. Louis, MO 88990

David Doyle  
6767 Diamond Place  
Aspen, CO 84555

Greg Voornas  
1013 Scott Road  
Boston, MA 31222

Kathryn Windt  
Main Street  
Saline

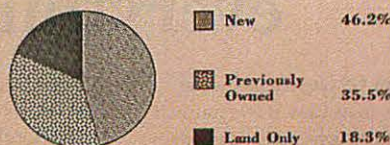
Gary and Lisa Elliot  
533 4th Street  
Denver, CO 80556

### COMMISSIONED SALES REPORT—JUNE

Sales Person	Type	Rate	Sales YTD	Billings	Check Amt.
Shannon Pitts	Commercial	3.80%	\$275,000	\$88,000	\$3344.00
Lisa Doan	Residential	3.00%	\$320,000	\$120,000	\$3600.00
Peter Cohen	Residential	3.00%	\$230,000	\$100,000	\$3000.00
Robbie Ross	Commercial	4.00%	\$500,000	\$340,000	\$13600.00
Mike Lucero	Residential	4.00%	\$150,000	\$65,000	\$2600.00
Gary Gigot	Residential	7.00%	\$700,000	\$260,000	\$18200.00
Mary Freeman	Residential	3.80%	\$450,000	\$60,000	\$2280.00
Joan McArthur	Residential	2.60%	\$250,000	\$99,000	\$2574.00
Barbara Miller	Commercial	3.00%	\$250,000	\$130,000	\$3900.00
Robyn Komachi	Commercial	2.80%	\$780,000	\$240,000	\$6720.00

Residential	704,000
New	325,000
Prev. Owned	250,000
Land Only	129,000
	100.00%

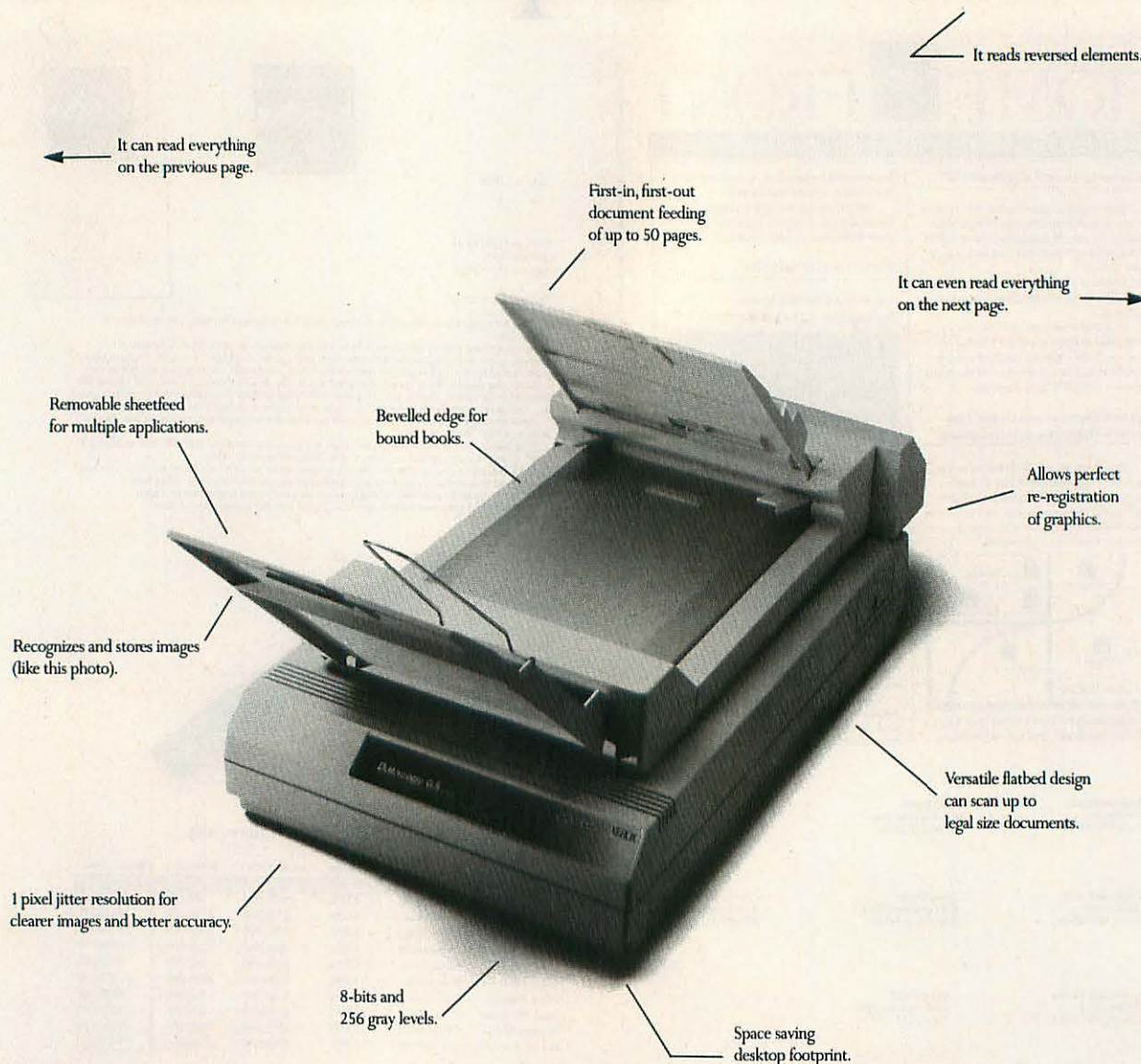
### Breakdown of Residential Sales



Everything you see above was created using some combination of the five tools within Microsoft Works 2.0: word processing, spreadsheet, database, drawing and communication. As you can see, the real power of Microsoft Works 2.0 comes into play when all the tools are used together.



# XEROX



## Introducing the new scanner that can read everything on this page.

The new Datacopy GS plus scanner is the fastest desktop scanner in its class. It lets you step instantly into high volume, high-quality scanning. Text. Images. It's the desktop publishers ideal scanning tool.

The scanning package includes compact, easy-to-use software tools for importing text and graphics. Available for both PC and Mac platforms.



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Powerful text scanning capabilities.

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**Xerox Imaging Systems, Inc.**


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**Circle 376 on reader service card**



## Nisus Gets Nicer

 Paragon Concepts is updating Nisus to version 3.0. The omnibus word processor originally made a name for itself with many features, including a macro language and UNIX-like GREP (Global Regular Expression Parser, which can search and replace by style, position in paragraph, and so on). Version 3.0 adds true style sheets, improved mail merge, and a hypertext-like Place command for nesting documents within other documents.

As style sheets go, Nisus 3.0's do some unusual things besides assigning fonts and indentation—for example, flagging text to be included in a table of contents or text to be skipped when checking spelling.

Nisus 3.0 initiates mail merges with a command on the File menu (version 2.0 used awkward macros). The merge process operates much the same as in Word 4.0, with users typing in bracketed merge fields, issuing the merge command, and sending the output to a printer or a document.

The new Place command fills a button in a Nisus document with the contents of another Nisus document. The button is resizable and can stretch out to fill a whole screen or shrink around a single word. Double-clicking on the button opens the ac-

tual document in its own window, and any changes made to text while in button format are automatically updated in the real document.

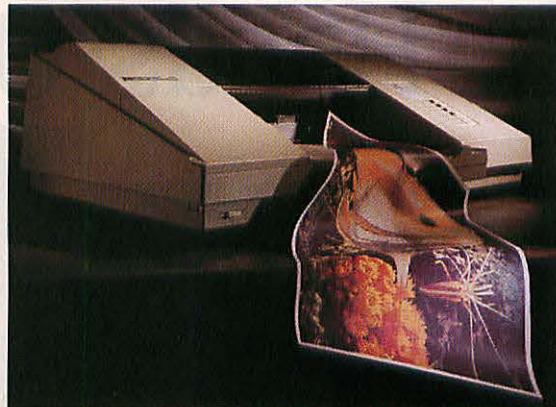
Version 3.0 includes other enhancements as well: the graphics module adds a freehand drawing tool, the ability to rotate graphics, and the ability to place graphics in front of or behind text; the dictionary-thesaurus has been expanded to 116,000 words; and you can select multiple blocks of separate text. Nisus 3.0 will list for \$395. For more information, contact Paragon Concepts in Del Mar, California, at 619/481-1477.

—Jonathan Cassell

## HP's Color PaintJet Goes Totally Mac



Soon after introducing its line of Mac-compatible LaserJet printers, Hewlett-Packard has announced its PaintWriter XL, a wide-body color ink-jet printer for the Mac. The PaintWriter XL accepts paper up to tabloid size for two letter-size pages



Hewlett-Packard's PaintWriter XL is a color ink-jet printer that can produce letter-size or 11-by-17-inch output.

of color output on a single sheet.

The device creates up to 16.7 million colors, depending on the capability of the Mac that drives it. It comes with four ink cartridges; one each of cyan, magenta, yellow, and black.

The printer can automatically handle transparencies or paper. It includes an AppleTalk connector that doubles as a serial port. The printer's I/O board senses whether it is attached to AppleTalk or to a serial port on a Mac and acts accordingly, HP says. The company expects to begin shipping the printer in April at a list price of \$2995, which includes four font families.

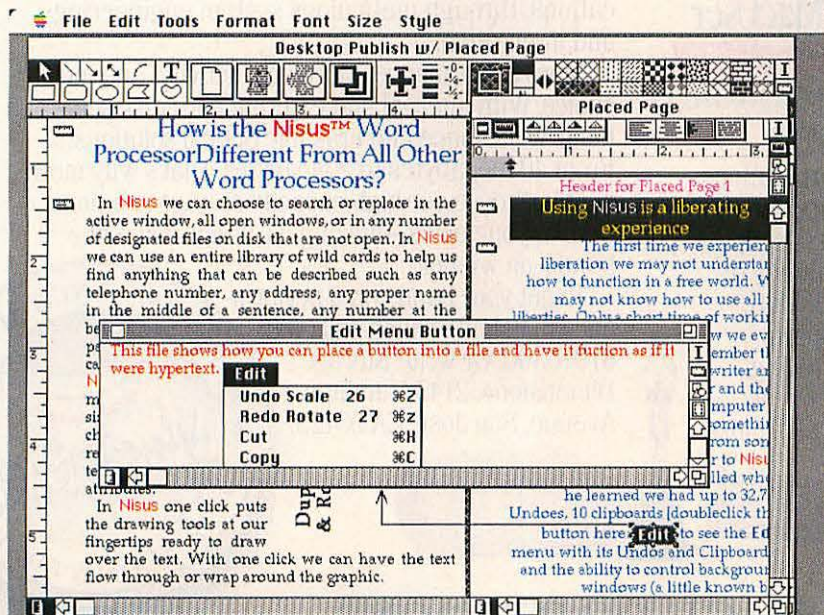
HP also recently announced that it has added AppleTalk-serial port connector capability to its popular monochrome DeskWriter ink-jet printer for the Mac. Current DeskWriters can be upgraded to the new connector at a list price of \$140. For more information, call Hewlett-Packard at 800/752-0900 (in Canada, call your local HP distribution center).—T.M.

## LCD Panel Projects 512 Colors



Computer Accessories Corporation has devised a 512-color LCD overhead-projection panel for presentations. Called the Proxima Data Display VersaColor, the panel uses separate red, blue, and yellow layers plus proprietary gray-scale technology to achieve the wide variety of colors.

The VersaColor panel, although (continues)

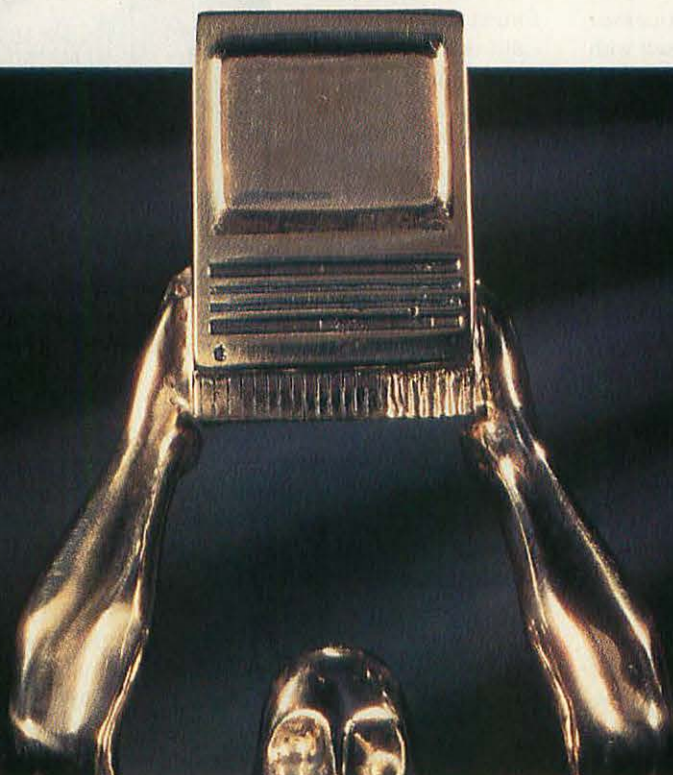


Nisus 3.0 in graphics mode. The word **Edit** in the main document is actually inside a button that opens the document in the front, which has a screen shot of the Edit menu in it.



# MacinStor.<sup>TM</sup>

## The Hands-On, Hands-Down



## Storage Champ.

"Best Storage System."\* 1989 Eddy Winner.

*MacUser*, March 1990.

"Most Polished Product." *MacWeek*,  
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"Top Ranked High Capacity Storage  
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From the top publications to the top corporations, MacinStor is the clear-cut choice in high performance, high capacity storage. The reason is simple enough. Everyone is looking for more. And they're getting more from MacinStor. More speed. More capacity. More quality, reliability and support.

At the heart of it all is *performance matching*, a concept that starts with the best specs, finest hardware components and the easiest to use, most powerful utilities software. And ends with optimum

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More performance. More productivity. And more choice. With internal and external hard disk solutions. Write-once and erasable optical solutions. From 40 megabytes to 2 gigabytes. That's why more people choose our high capacity storage solutions than anyone else's—making us, hands down, the hands-on winner.

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## STORAGE DIMENSIONS





**The VersaColor overhead-projection LCD panel from Computer Accessories displays up to 512 colors.**

admittedly a bit slow, produces convincing renditions of complex color graphics such as CAD/CAM images with multiple light sources. Designed to project a variety of resolutions and graphics standards, the VersaColor works with the Mac II series, IBM PCs and compatibles, and PS/2 systems and compatibles, according to Computer Accessories.

For the Mac II, the panel displays 640 by 480 pixels, while for VGA systems it configures itself for 740 by 400 pixels, the company says. The panel also works with the EGA and CGA graphics standards of the IBM world.

The VersaColor projection panel, slated to ship in May, has a suggested retail price of \$6499, including a remote control and a coupon for the user's choice of DOS or Mac presentation software. An optional adapter will be available for compact Macintoshes. For more information, contact Computer Accessories in San Diego, California, at 619/457-5500.—T.M.

## The HyperCard Hospital



Medical knowledge is changing so fast that no medical practitioner can keep up with the latest advances. To cope, medical schools are training students to solve problems as they come up, largely by extracting and analyzing information from massive medical databases. But when computer-literate students take jobs in hospitals, they find little access to computers, according to Edward Shultz, a physician and professor at Dartmouth College's Hitchcock Medical Center.

Shultz, with Apple's help, is pouring Macs into Dartmouth's hospital and developing Interactive Medical

Record (IMR), a vast network of HyperCard stacks sitting on an Oracle database. IMR is only partly completed and part prototype, and is still largely a training tool for Dartmouth's medical school. Eventually IMR will provide both a front end for the incompatible computers at Hitchcock (in radiology, pharmacology, and lab work, for example) and a set of tools to help physicians analyze information about their patients.

With IMR, a doctor will be able to record a patient's heartbeat, digitize it, and play it back when the patient returns the next day—or the next year. TIFF images of X rays, which are usually good enough that doctors don't need to see the X-ray film itself, will travel over the network with a file; better still, IMR will have a full set of

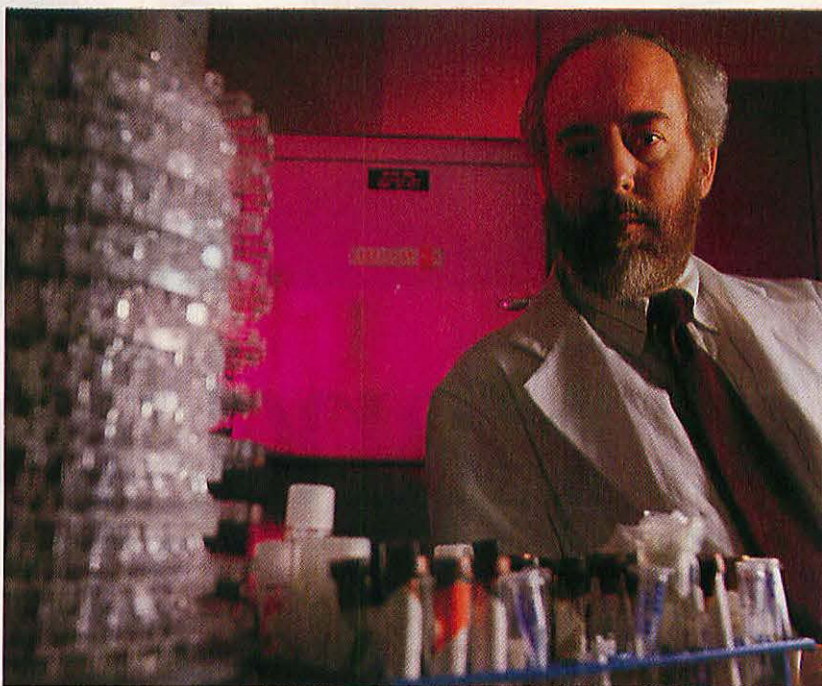
photos or videos that surgeons normally study). And in case the doctor's diagnosis is wrong, security features using IMR's Oracle core will prevent a dishonest physician from altering the records.

A Dartmouth spin-off called Digital Medicine plans to take IMR commercial. For more information, call Digital Medicine in Lyme, New Hampshire, at 603/643-3686.—D.L.

## Face Mail for a Bargain



Magnum Software's TFLX combines hardware and software to make a telephone system do everything from basic voice mail to automated order entry and automated outgoing calls. Now Mag-



**Dr. Edward Shultz of Dartmouth's Hitchcock Medical Center is spearheading development of an online medical record system that will be installed in Dartmouth's new hospital.**

num is shipping special software for using video phones with a TFLX setup, and the company is preparing a \$500 unit with many of the \$2995 TFLX's capabilities.

The PAX (Picture Audio Express) video option transmits slow-scan video images to a Mac with a TFLX unit from either a stand-alone video phone or from a Mac connected to another TFLX unit. PAX can send images from high-

(continues)





# Hand Tools.

You know what it's like. If you're in graphic arts, you know there's a lot of grunt-work.

Like rubbing-down type. And tracing and filling letters to comp-up headlines.

Trying to get true colors from a junkyard of dried-out markers.

Inking and re-inking rules and borders because of clogged pens.

T-squaring elements to be sure they're aligned and square.

Counting characters.

Spinning proportion wheels.

Tracing off the Lucy.

Wouldn't it be nice to spend more time exercising your brain instead of

your wrist? Exploring concepts? Refining layouts? Trying "What if" design options? Or experimenting with color combinations?

That's exactly what you can do using today's advanced layout, design, and illustration programs, the Macintosh II™ family of computers and a CalComp DrawingCard™ display system.

CalComp large screen displays help you get the most from your Macintosh. For one thing, they never let you lose sight of the big picture. DrawingCard is the first 21" system to give you two full pages of color side-by-side at actual size. That's critical when you're

designing double-track ads, brochure spreads or creating a large horizontal illustration.

DrawingCard's flat screen eliminates distortion and with its excellent resolution and contrast you can see the effect of small changes in the colors right on the screen. Or evaluate the visual effect of half-point variations in type size and leading. You can even see the precise amount of letter overlap when you set your headlines "tight and touching."

And with DrawingCard displays, what you see on the screen is what you get on your printer because screen resolution is true 72 dpi.





21" ChromaVision Plus

# Power Tools.

There are three DrawingCard systems to choose from. Our 8-bit GrayVision display system with 256 shades of gray is ideal for desktop publishing and design projects using line art and black-and-white halftones.

Our 8-bit ChromaVision system with 256 colors is the perfect match for the great majority of desktop pub-

lishing, design and illustration projects where 4-color reproduction is needed.

And our 24-bit ChromaVision Plus system (shown above) with 16.7 million colors is the ultimate display where color accuracy is especially critical such as color retouching.

DrawingCard display systems are just one way CalComp, a worldwide

graphics leader, supports the arts on Macintosh. There's also WIZ™, a new mouse system that combines the features of a traditional mouse with the power of a graphics pad. Plus a complete line of high-performance printers.

So stop using those antique hand tools today. After all, the graphic arts should be full of inspiration, not perspiration. For more information about DrawingCard displays, call:

**1-800-CalComp.**

In Canada, call: (416) 635-9010.

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21" GrayVision



21" ChromaVision

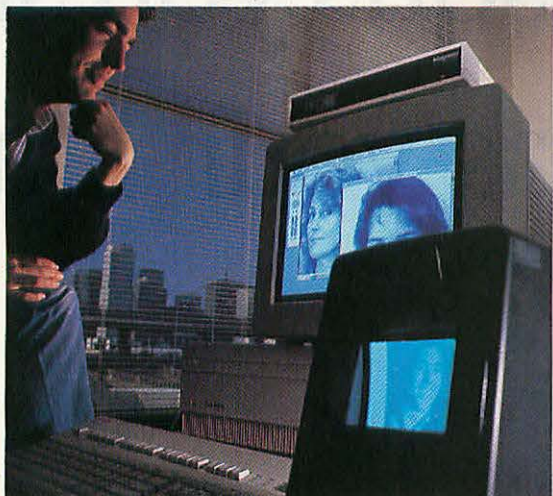


*DrawingCard monitors feature 75Hz refresh rate for flicker-free performance, large live area (1152x870 pixels) and 72dpi screen resolution for true WYSIWYG.*









ROBERT HOLMSEN

A video telephone and TFLX's PAX option is all you need to go online with images. Example: a video dating service.

resolution and color video phones, but can only edit 98-by-98-pixel images at 64 levels of gray—that size image takes about five seconds to transmit.

Video telephone technology is still in its infancy. Simple black-and-white units range from \$300 to \$600, and image quality is not impressive (on the 98-by-98-pixel screen it seems as if you could grab pixels with a pair of tweezers).

The PAX option provides additional commands to use in TFLX Creator scripts for drawing images on the screen, storing them on disk, and managing database-like access to incoming and outgoing images. A user with a simple video telephone can, for example, log on to a Mac hooked up to a TFLX and browse through a real estate agent's database of houses or leave a "face-mail" message at a computerized dating service. PAX's graphics editor lets users annotate images with eight to ten 40-character lines of text using Mac fonts and supports control of brightness and contrast, zooming, modifying image size, and other basic editing tasks.

Magnum Software is also developing a stripped-down \$500 unit, called the TFLX-VM (Voice Mail). It will lack the modem, BRS port (for remote control of household appliances), and some other features of the full TFLX, and the software will lack support for the variables and equations necessary for order entry and other complex tasks. But the TFLX-VM will support many of the TFLX's neat features, in-

cluding PAX and the ability to convert text E-mail messages to speech using either Macintosh or a database of several thousand digitized spoken words. More sophisticated software is also in the works for the TFLX-VM.

The PAX option is free to registered TFLX owners. For more information contact Magnum Software in Chatsworth, California, at 818/701-5051.

—Mary Margaret Lewis

## Controlling a Host of Multimedia Devices



A multimedia control device from Interactive Media Technologies (IMT) can coordinate input and output for up to eight audio and/or video devices. Described as a desktop multimedia integration system, the IMTX 8000 is an external box that connects to the controlling Macintosh or IBM PC via a serial port.

Using customized drivers, the system can simultaneously control input and output signals of a total of eight

MIDI devices, video cameras, VCRs, CD ROM players, Laserdiscs, and open-reel tape recorders. Several IMTX 8000s can be daisy-chained to support more sources if necessary. IMT said it has written control software for the most popular audio and video devices and is in the process of creating more.

To provide a consistent interface regardless of the peripheral device, IMT uses Silicon Beach's SuperCard, a color superset of HyperCard, both of which come with the system. Also shipped with the IMTX 8000 are XCMDs and stacks on interactive authoring and multimedia construction.

In addition to control of the source peripherals, the IMTX 8000 provides audio and video routing, time-code indexing of video frames, and audio mixing. It contains a CPU and a proprietary bus with slots for up to ten add-in boards. The boards will range from network adapters to special-effects boards and MIDI or SCSI controllers, according to the company.

Depending on the final hardware configuration and the boards chosen, the IMTX 8000 should have a retail price between \$7000 and \$12,000. The company has scheduled its release for the fourth quarter of this year. For more information, contact IMT in Scottsdale, Arizona, at 602/443-3086.

—T.M.

(continues)



TOM GIBSON

Interactive Media Technologies' IMTX 8000 is a desktop multimedia integration system that can control up to eight sources of audio and/or video, including CD ROM players and tape recorders.

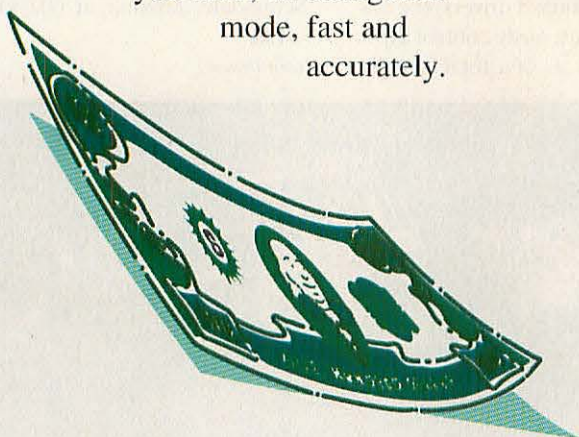


# Four good reasons you should as your Data



## 1 Flexibility...

With the new CTA ScanReader™ program you can automatically enter printed information into your word processor, database, or spreadsheet programs. Forms, catalogs, manuscripts, brochures, technical manuals and documents can be fed into your Macintosh many times faster than manual keying. Requiring only 1 megabyte of memory, Scan Reader™ can read entire pages or just the information you need, in background mode, fast and accurately.



## 2 Easy to Use...

Designed to make your workload lighter, Scan Reader™ makes easy work of entering masses of printed information into your computer. Just SCAN and READ! Needs no training, it's automatic. Nothing could be simpler!

## 3

## Reliability...

Whatever source of material—text or numeric tables—Scan Reader™ offers a level of accuracy you can count on. Direct control of Macintosh scanners allows you to adjust the quality of every scan. Enter everything from magazine articles to daily correspondence!

### TECHNICAL SPECIFICATIONS

**SYSTEM REQUIREMENTS**  
Mac Plus, Mac SE, MacII, MacIcx, MacIci.

**MEMORY REQUIREMENTS**  
1Mb RAM. 2Mb hard disk space.

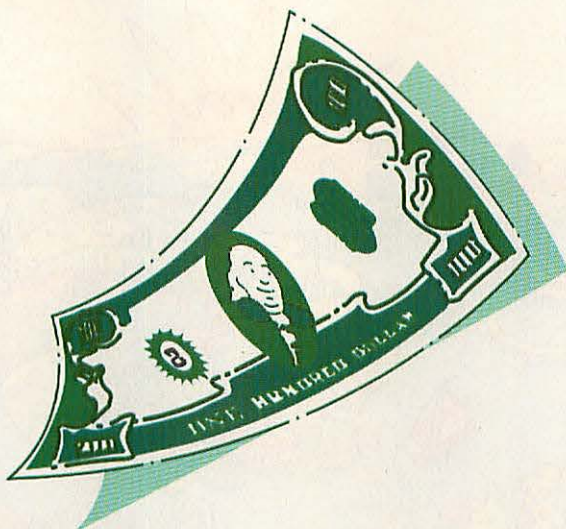
**SCANNERS SUPPORTED**  
Abaton, Agfa, Apple, Canon, Dest, Howtek, HP, Microtek, Panasonic, SHARP

**INPUT FORMATS**  
TIFF compressed, TIFF uncompressed, SCAN, IMAG.

**OUTPUT FORMATS**  
ASCII, MacWrite, MS Word.



# ould be using ScanReader™ Entry Tool

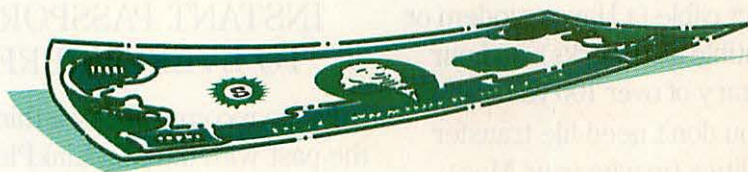


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No more long hours of manual keyboard entry. Make big gains in your company's productivity, with ScanReader™.... Enter information into your computer the fast efficient way. Days of work can be handled in matter of hours... with BIG MONEY savings for your company.

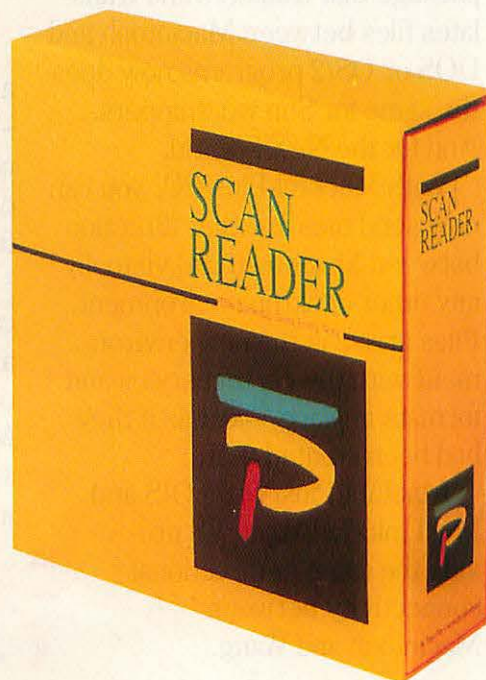
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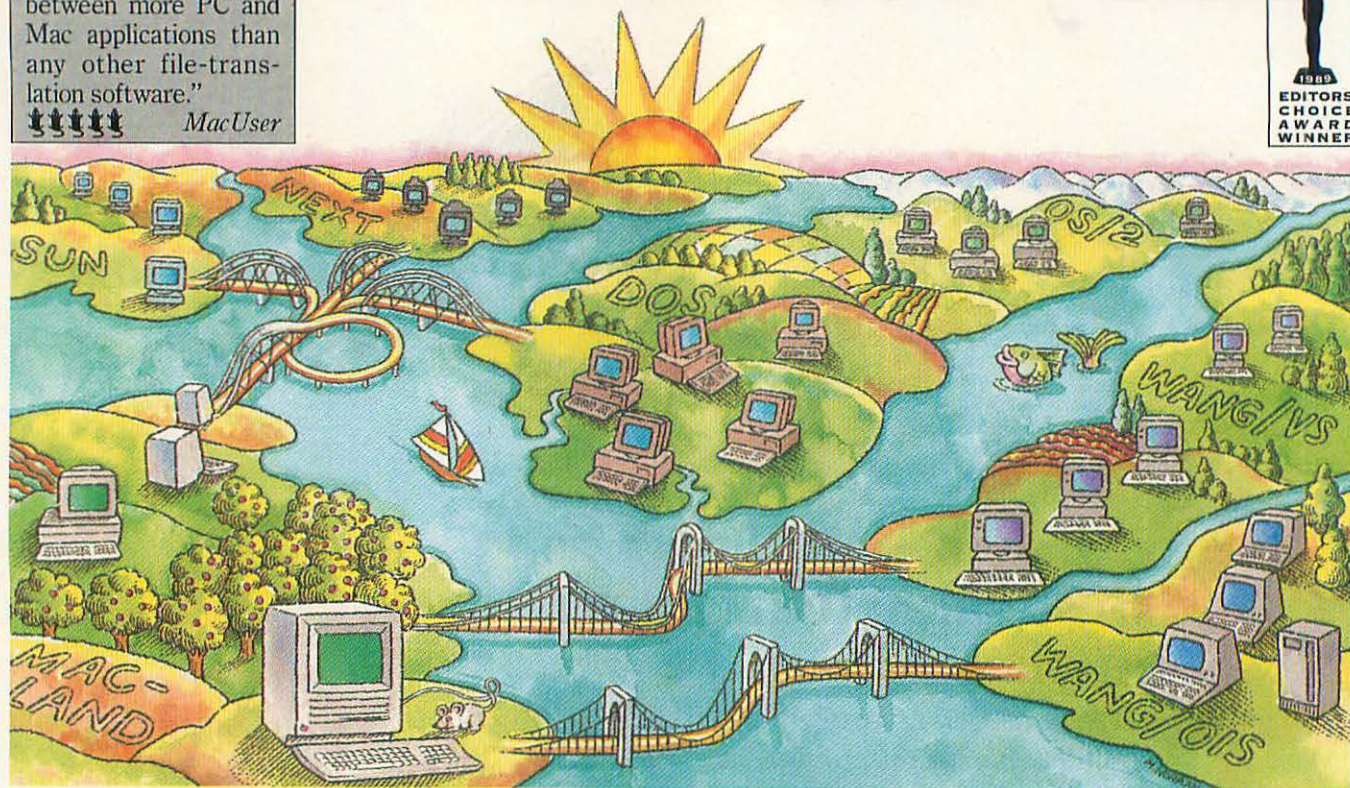
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MacUser



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ties. And, it's the ideal software purchase for anyone with a Macintosh FDHD SuperDrive or external drive that reads DOS disks.

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\*takes advantage of special connections built into MacWrite® II from Claris™

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## Microtech Introduces Hard Disks and Memory Products



In a salvo of product releases, Microtech International has announced two 320MB hard disks, a 16MB memory-expansion kit, and two types of SIMMs for the Macintosh IIx.

Microtech's two new 320MB hard disks are the N320i internal, listing for \$1999, and the N320 external, listing for \$2299. Both drives sport an access time of 14ms. The N320 features push-button SCSI address selection, universal input power supply, and external-fuse protection.

Microtech expects to bundle Peter Norton Computing's Norton Utilities for the Macintosh with all its hard disks. The package is a series of data-protection and safety tools for memory media and devices.

Total Recall, a backup utility from Centa Systems, is also being bundled with Microtech's hard disks and tape backups.

Microtech's 16MB expansion package makes it possible to install up to 32MB on Macintosh IIs and SE/30s. The package, listing for about \$2800, consists of four 4MB SIMMs and Maxima memory-management software from Connectix, the maker of the virtual-memory program Virtual 2.0. Maxima adds to System 6.0's 8MB ceiling by recapturing memory allocated to a Macintosh II's six NuBus slots, providing up to 14MB of system RAM.

Maxima turns memory beyond the 14MB limit into a RAM disk, which is accessed as if it were virtual memory on a hard disk.

Microtech is offering 1MB SIMMs for the new Macintosh IIx for \$179 and 4MB SIMMs for the IIx for \$999. SIMM prices for the IIx are higher than for other machines because the IIx can read and write to memory at the same time, which requires 64-pin connectors, as opposed to conventional 30-pin connectors.

Microtech also said that it will release a removable hard disk, dubbed the R50. Microtech, which formerly used Syquest drives, employs a Ricoh mechanism for the R50. The R50, listing for \$1299, uses 50MB cartridges and has an average access time of 25ms. The cartridges list for \$129. For more information contact Microtech in Branford, Connecticut, at 203/468-6223.—Jonathan Cassell

## FileMaker Gets Major Upgrade



First there was FileMaker IV, then FileMaker II, but a FileMaker III there will never be. Instead, Claris plans to call it FileMaker Professional and, semantics aside, the new version has a mountain of new features and fixes most of the things that were wrong with its predecessor.

In the things-fixed category: the Layout window has zooming, a MacDraw-like alignment dialog box, and an editable snap-to grid; resize handles appear on all four corners of selected objects; layouts can have names; line leading can be set for text; when you add a field to a layout, it brings its label with it; ar-

M.T.N. Trek		Employee Benefits Analysis	
Department No.	1001	Birthdate	01/01/1950
Salary	\$10,000.00	Take 401k	0.00
Flexible spending	\$0.00	EAP Visits	0
Medical coverage	0	Education	\$10,000.00
Dental Coverage	0	401(k)	\$4,000.00
		Workman's Compensation	\$1,000.00
		Business Travel and Accident	\$0.00
		Pension, gifts, etc.	\$0.00
		<b>TOTAL PAY</b>	<b>\$14,000.00</b>
		+ 50% Social Security Tax	\$7,000.00
		+ 50% Social Security W. & Salary	\$7,000.00

A FileMaker Professional database layout showing radio buttons and buttons that launch actions such as printing.

rangement of subsummaries and other layout parts for creating reports is simpler and more intuitive; print preview is nonmodal.

In the new features category: a list field can be a group of radio buttons or check boxes; a 64-color (uneditable) palette is available for lines, shading, text, and other objects; there's a new field type for time data; the new spelling checker shares a dictionary with other Claris products; on shared databases you can control access to fields and layouts by groups, and an overview window simplifies access management; when importing data, you can choose which fields you want, line them up as you want them, and test a sample record before importing a file; FileMaker Pro layouts can be 92 by 92 inches; graphic objects can be buttons that trigger any command or a script; script enhancements include the ability to stop and get user input such as a date range.

FileMaker Pro has the XTND data import interface that Claris is adding to its product line, but databases are by their nature difficult to exchange data with, and it isn't clear what XTND will do for FileMaker. This version does nothing to confirm speculation that FileMaker might become the back end for Claris's SmartForm, and it doesn't show any signs of the Wingz technology Claris recently acquired from Informix.

FileMaker's price remains unchanged at \$299; upgrades from FileMaker IV or II are \$99, or free if you purchased FileMaker after April 1, 1990. For more information, contact Claris in Santa Clara, California, at 408/987-7000.—D.L.



Microtech International's 320MB hard disk (top), and the R50, a 50MB removable-cartridge hard disk.



CALL FOR ENTRIES

# SUPERSTACKS!

## 3<sup>RD</sup> ANNUAL CONTEST



HyperCard



Plus



SuperCard



### Be Famous

We'll write about your winning entry in *Macworld*.

### Win Great Prizes

- A 4MB memory upgrade from National Semiconductor
- An Audiomedia digital audio recording system from Digidesign
- A MediaTracks Multimedia Pack from Farallon Computing
- A MacinStor 100-ZFP hard disk from Storage Dimensions



### Deadline

*Macworld* must receive entries by August 15, 1990.

### Sponsored by

Apple Computer, Digidesign, Farallon Computing, *Macworld* magazine, National Semiconductor, Silicon Beach Software, Spinnaker Software, and Storage Dimensions.

### Contest Rules

No more than two (2) entries per contestant. Each entry must include a \$5 entry fee and a one-page summary headed with the name of entry, contest category, K-count, the price of entry, as well as your name, address, and phone numbers. In the summary, state the purpose and intended audience of your entry.

Disks will not be returned. Employees of the sponsors are not eligible to enter. Winning stacks from the 1989 SuperStacks contest are not eligible. *Macworld* reserves the right to republish or reuse winning entries.



### Categories

- **Best Commercial Entry**
- **Best Vertical-Market Entry** Entries custom made to solve a specific need
- **Best Training Entry**
- **Best Educational Entry**
  - K-12 entries
  - Higher education entries
- **Best Entry Available for under \$20**
- **Best Multimedia Entry** Laserdiscs, CD ROM, and Mac-based presentations accepted. No videotape submissions will be accepted.
- **Best Entry by Kids** (Age 16 and under)
- **Best International Entry**
- **Best Interface Design**
- **Best Development Tool**
- **Leslie Liedtka Memorial Award** This award will go to the best application that doesn't fit into any of the other categories.

Send your entry to  
**MACWORLD**

SuperStacks Contest  
501 2nd St.

San Francisco, CA 94107

Make your check or money order payable to *Macworld*.



# Tomorrow's Upgrade For Your Mac Is Only \$85\*

**FREE!**  
STEP-BY-STEP  
VIDEO  
INSTRUCTIONS

A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

## MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

## PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. Just open your Mac, slide out the main circuit board and plug in your SIMMs. Our FREE video will give you STEP-BY-STEP installation instructions. Every type of Mac is covered and we think we've made it a breeze.

## WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@ \$85 each).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIfx, IIfx, or SE30 to this amount of memory	Do this: (Install in multiples of four only)
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$9.

## WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

Prices can vary a lot, based on quality, speed and demand. At press time

our price for 1MB, 100 ns SIMMs is \$85. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

## SPEED

Do you need 70, 80 or 100 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

## OVERNIGHT DELIVERY

Place your order by 12:00 a.m. (E), weekdays and we'll deliver overnight for just \$3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

**MacWAREHOUSE**  
1-800-255-6227

Call toll-free  
Twenty-four hours a day,  
seven days a week.  
Inquiries 1-201-367-0440  
Fax 1-201-905-9279

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## MACWAREHOUSE 30 DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

**ONE YEAR WARRANTY.** MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

MWGØP

\* SIMMs prices vary. Call for latest information.

\*\* Limited Offer! Free video with purchase of 2 or more SIMMs.



# The Font Specialist

Whether you're a professional graphic designer or a Mac user looking to improve a memo or presentation, you'll be delighted to choose from the mind-boggling variety of Adobe typefaces. And there's no need to scour the earth for your selection. MacWAREHOUSE carries the full library of Adobe

PostScript® typefaces for the Mac, including the newest additions. Choose from the fonts below or ask for a copy of our catalog. Order your fonts anytime up to 12:00 midnight, and we'll deliver overnight for just \$3.00. Remember, nobody beats MacWAREHOUSE for your font needs — nobody!

**FON 0254** **Candida® Roman** **NEW!**  
Candida Italic  
Candida Bold

**FON 0247** **Dom Casual** **NEW!**  
Dom Casual Bold

**FON 0236** **Franklin Gothic® No. 2 Roman** **NEW!**  
Franklin Gothic Condensed  
Franklin Gothic Extra Condensed

**FON 0167** **Goudy Extra Bold** **NEW!**  
Goudy Heavyface  
Goudy Heavyface Italic

**FON 0163** **Helvetica® Compressed** **NEW!**  
Helvetica Extra Compressed  
Helvetica Ultra Compressed

**FON 0240** **Impressum® Roman** **NEW!**  
Impressum Italic  
Impressum Bold

**FON 0078** **ITC American Typewriter®** **NEW!**  
Medium  
ITC American Typewriter Bold  
(Includes ITC Machine)

**FON 0248** **ITC MACHINE®** **NEW!**  
(Includes ITC American Typewriter)

**FON 0171** **OCR-A** **NEW!**  
OCR-A ABCDefgh12345  
OCR-B ABCDefgh12345

**FON 0243** **Post Antiqua®** **NEW!**  
Post Antiqua Bold

**FON 0146** **STENCIL** **NEW!**  
(Includes Brush Script & Hobo)

**Hobo**  
(Includes Brush Script & Stencil)

**Brush Script**  
(Includes Hobo & Stencil)

**FON 0281** **UMBRA** **NEW!**  
(Includes Parisian)

**FON 0250** **Tempo® Heavy Condensed** **NEW!**  
Tempo Heavy Condensed Italic  
(Includes Gothic 13)

**Gothic 13**  
(Includes Tempo)

Suggested Retail: \$445 **\$97**

**FON 0251** **Berthold Akzidenz Grotesk® Light** **NEW!**  
Berthold Akzidenz Grotesk Roman  
Berthold Akzidenz Grotesk Bold  
Berthold Akzidenz Grotesk Black

**FON 0181** **Americana®** **NEW!**  
Americana Italic  
Americana Bold  
Americana Extra Bold

**FON 0198** **Antique Olive® Light** **NEW!**  
Antique Olive  
Antique Olive Italic  
Antique Olive Bold  
Antique Olive Black

**FON 0256** **Arnold Böcklin** **NEW!**  
(Includes Fette Fraktur, Helvetica Inserat & Present Script)

**Fette Fraktur** **NEW!**  
(Includes Arnold Böcklin, Helvetica Inserat & Present Script)

**Helvetica Inserat** **NEW!**  
(Includes Arnold Böcklin, Fette Fraktur & Present Script)

**Present® Script** **NEW!**  
(Includes Arnold Böcklin, Fette Fraktur & Helvetica Inserat)

**FON 0249** **Cochin®** **NEW!**  
Cochin Italic  
Cochin Bold  
Cochin Bold Italic

**FON 0246** **Folio® Light** **NEW!**  
Folio Medium  
Folio Bold  
Folio Extra Bold  
Folio Bold Condensed

**FON 0193** **Garamond 3\*** **NEW!**  
Garamond 3 Italic  
Garamond 3 Bold  
Garamond 3 Bold Italic

**FON 0269** **Adobe Garamond Expert Collection™** **NEW!**  
ADOBE GARAMOND EXPERT REGULAR  
ADOBE GARAMOND EXPERT ITALIC  
ADOBE GARAMOND EXPERT SEMIBOLD  
ADOBE GARAMOND EXPERT SEMIBOLD ITALIC  
ADOBE GARAMOND EXPERT BOLD  
ADOBE GARAMOND EXPERT BOLD ITALIC  
ADOBE GARAMOND TITLING CAPITALS  
ADOBE GARAMOND ALTERNATE REGULAR  
ADOBE GARAMOND ALTERNATE ITALIC

**FON 0245** **Sabon® Roman** **NEW!**  
Sabon Italic  
Sabon Bold  
Sabon Bold Italic

**FON 0244** **VAG Rounded Thin** **NEW!**  
VAG Rounded Light  
VAG Rounded Bold  
VAG Rounded Black

**FON 0255** **Berthold Walbaum®** **NEW!**  
Berthold Walbaum Italic  
Berthold Walbaum Bold  
Berthold Walbaum Bold Italic

Suggested Retail: \$465 **\$125**

**FON 0147** **Aachen Bold** **NEW!**  
(Includes Freestyle Script, Revue & University Roman)

**Revue**  
(Includes Aachen Bold, Freestyle Script & University Roman)

**University Roman**  
(Includes Aachen Bold, Freestyle Script & Revue)

**Freestyle Script**  
(Includes Aachen Bold, Revue & University Roman)

**FON 0118** **Bodoni** **NEW!**  
Bodoni Italic  
Bodoni Bold  
Bodoni Bold Italic  
Bodoni Poster



## Adobe Type Manager

ATM works with the more than 600 typefaces from the Adobe® Type Library to ensure that your type looks sharp on-screen and prints sharp from your Apple ImageWriter®, HP DeskWriter™, and most other QuickDraw™ devices. The MacWAREHOUSE low price is just .....\$55! Order No. FON 0291

**FON 0290** **TRAJAN® REGULAR** **NEW!**  
TRAJAN BOLD  
(Includes Charamagne)

**120 CHARLEMAGNE® REGULAR** **NEW!**  
CHARLEMAGNE BOLD  
(Includes Trajan)

**FON 0289** **WOOD TYPE I** **NEW!**  
COTTENWOOD  
ABCEFGHIJKLMNOP  
QRSTUVWXYZ&!@#123  
PONSEROSA  
ABCEFGHIJKLMNOPQRSTUVWXYZ&!@#1234567890  
IRONWOOD  
ABCEFGHIJKLMNOPQRSTUVWXYZ&!@#  
MESQUITE  
ABCEFGHIJKLMNOPQRSTUVWXYZ&!@#  
JUNIPER  
ABCEFGHIJKLMNOPQ  
ORNAMENTS  
Suggested Retail: \$465 **\$127**

**FON 0157** **Eurostile®** **NEW!**  
Eurostile Oblique  
Eurostile Demi  
Eurostile Demi Oblique  
Eurostile Bold  
Eurostile Bold Oblique

**FON 0152** **Futura Light** **NEW!**  
Futura Light Oblique  
Futura Book  
Futura Book Oblique  
Futura Bold  
Futura Bold Oblique

**FON 0159** **Futura®** **NEW!**  
Futura Oblique  
Futura Heavy  
Futura Heavy Oblique  
Futura Extra Bold  
Futura Extra Bold Oblique



## Adobe Type Reunion

Sorts your fonts by family names! Now, all those bold, light and italic variations will appear on a convenient sub-menu adjacent to the main family name. Works with Adobe, Agfa, and Bitstream fonts, Suitcase II and Master Juggler, too! The MacWAREHOUSE low price is just .....\$39! Order No. FON 0295

**FON 0282** **Utopia® Regular** **NEW!**  
Utopia Italic  
Utopia Semibold  
Utopia Semibold Italic  
Utopia Bold  
Utopia Bold Italic  
Utopia Black

Suggested Retail: \$275 **\$179**

**FON 0288** **Adobe Garamond® Regular** **NEW!**  
Adobe Garamond Italic  
Adobe Garamond Semibold  
Adobe Garamond Semibold Italic  
Adobe Garamond Bold  
Adobe Garamond Bold Italic

Suggested Retail: \$275 **\$182**

**FON 0238** **ITC Berkeley Oldstyle® Book** **NEW!**  
ITC Berkeley Oldstyle Book Italic  
ITC Berkeley Oldstyle Medium  
ITC Berkeley Oldstyle Medium Italic  
ITC Berkeley Oldstyle Bold  
ITC Berkeley Oldstyle Bold Italic  
ITC Berkeley Oldstyle Black  
ITC Berkeley Oldstyle Black Italic

**FON 0160** **Futura Condensed Light** **NEW!**  
Futura Condensed Light Oblique  
Futura Condensed  
Futura Condensed Oblique  
Futura Condensed Bold  
Futura Condensed Bold Oblique  
Futura Condensed Extra Bold  
Futura Condensed Extra Bold Oblique

**FON 0117** **Helvetica Condensed Light** **NEW!**  
Helvetica Condensed Light Oblique  
Helvetica Condensed  
Helvetica Condensed Oblique  
Helvetica Condensed Bold  
Helvetica Condensed Bold Oblique  
Helvetica Condensed Black  
Helvetica Condensed Black Oblique

**FON 0237** **Hiroshige® Book** **NEW!**  
Hiroshige Book Italic  
Hiroshige Medium  
Hiroshige Medium Italic  
Hiroshige Bold  
Hiroshige Bold Italic  
Hiroshige Black  
Hiroshige Black Italic

**FON 0239** **New Aster®** **NEW!**  
New Aster Italic  
New Aster Semi Bold  
New Aster Semi Bold Italic  
New Aster Bold  
New Aster Bold Italic  
New Aster Black  
New Aster Black Italic

**FON 0150** **Univers Light 45** **NEW!**  
Univers Light Oblique  
Univers 55  
Univers Oblique  
Univers Bold 65  
Univers Bold Oblique  
Univers Black 75  
Univers Black Oblique

Suggested Retail: \$370 **\$239**

**FON 0180** **ITC Clearface® Regular** **NEW!**  
ITC Clearface Regular Italic  
ITC Clearface Bold  
ITC Clearface Bold Italic  
ITC Clearface Heavy  
ITC Clearface Heavy Italic  
ITC Clearface Black  
ITC Clearface Black Italic

Suggested Retail: \$370 **\$245**

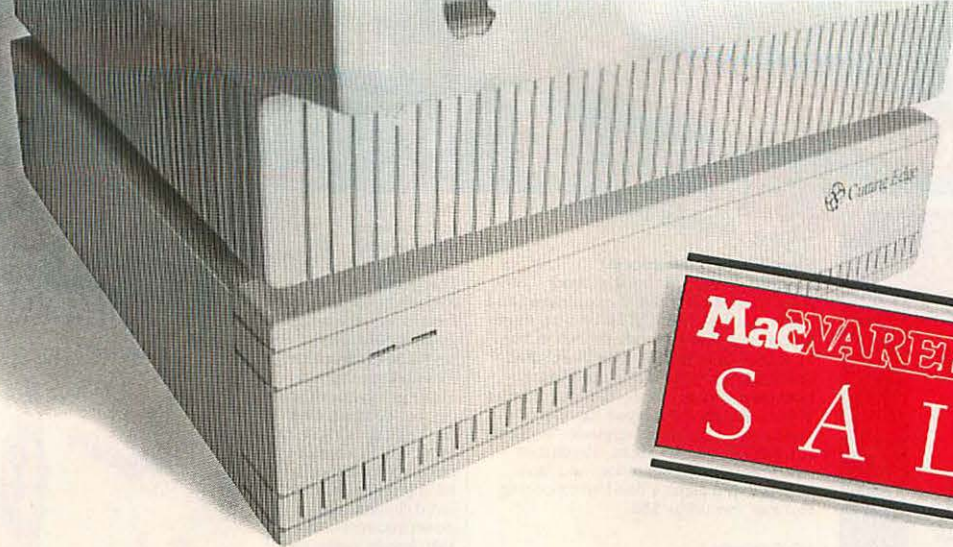
# MacWAREHOUSE™

## 1-800-255-6227

Call 24 hours a day, 7 days a week

**ADOBE**  
MWAGØ





# If You Can Find A Better Deal In Hard Drives . . .

Between now and **June 30th**, MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Power User, PLI Infinity Turbo and others — all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which drive

## MONEY BACK GUARANTEE

They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied,

## LIMITED TIME OFFER

MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid

through **June 30, 1990**.) Overnight delivery is just \$3, anywhere in the Continental United States.

So call us now and tomorrow morning you'll be up and running with the best hard drive deal in the business!

	20 + MB		30 + MB		40 + MB		60 + MB		80 + MB		***40 + Removable	
	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE
Cutting Edge	339	\$100	379	\$120	435	\$114	469	\$160	529	\$210	699	\$200
CMS, MacStack	429	\$100	499	\$46	589	\$36	649	\$50	769	\$30	839	\$36
Power User	319	NEW	359	NEW	399	NEW	459	NEW	499	NEW	659	NEW
PLI, Infinity Turbo	-	-	569	\$20	619	**\$26	-	-	-	-	999	\$120
*Quantum Internal	-	-	-	-	399	\$126	-	-	649	\$220	-	-

Savings are calculated from MacWarehouse December 1989 published prices. \*Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for \$75. \*\*PLI is a 50meg turbo drive. \*\*\*40 + meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

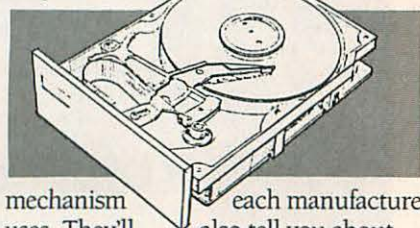
just return it to us within thirty days and we'll refund your money.

Then there's the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won't be without a drive for more than a few hours.

## READY TO USE

A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.



mechanism each manufacturer uses. They'll also tell you about access speed, reliability, software and the manufacturer's warranty.

**MacWAREHOUSE**  
**1-800-255-6227**

Call toll-free  
Twenty-four hours a day,  
seven days a week.  
Inquiries 1-201-367-0440  
Fax 1-201-905-9279  
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## MacWarehouse 30-Day Money Back Guarantee

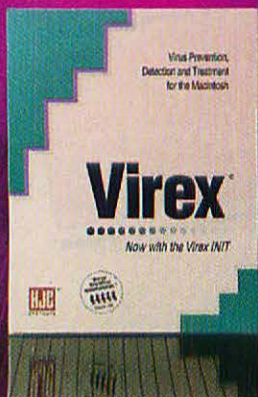
Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.



**OVERNIGHT DELIVERY**  
**ONLY \$3.00**  
(See details below)

**GUARANTEE**

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.



#### Virex 2.2 (HJC/Microcom)

Immunize your Mac against deadly computer viruses! Just give the command and Virex with The Virex INIT is on duty monitoring your Mac to prevent infection from all known Mac viruses. Use Virex's Record/Scan feature to identify previously unknown viruses. Once diagnosed, order Virex to operate and repair files like a skilled surgeon. Rapid upgrades stop new virus strains in their tracks. Registered users receive update notices and have access to publisher's Toll-free Virex Help Hotline. (security) \$52.

#### I/O Designs

Imageware II Carrying Case .....	49.
Macinware IIx Carrying Case .....	85.
Macinware Mac II Carrying Case .....	99.
Macinware Plus Carrying Case .....	64.
Macinware SE Carrying Case .....	75.
Monitorware Apple RGB Case .....	79.
The Ultimate SE Carrying Case .....	79.
<b>Kensington</b>	
Anti-Glare Filter .....	33.
Apple Security System .....	34.
LaserWriter II Security System .....	32.

#### UnMouse (Microtouch)

The UnMouse does everything a mouse can - only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection, merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs as a small graphics tablet. Requires a Mac with ADB port. (input/output) \$189.



Mac II Stand w/Cable Kit .....	64.
MasterPiece Mac II .....	105.
PowerBacker 360 UPS Line .....	269.
PowerBacker 800 UPS Line .....	749.
PowerBacker 1200 UPS Line .....	949.
System Saver .....	63.
<b>Mobius Products</b>	
Fanny Mac QT .....	55.
SE Silencer .....	39.
<b>Polaroid</b>	
Circular Polarizing Filter .....	35.
<b>Targus, Ltd.</b>	
Deluxe Plus/SE-XKB Case (black) ....	69.
ImageWriter II Case (black) .....	45.
Mac Plus/SE Case (black) .....	55.
IIcx/IIci Case .....	75.

#### Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)

Pamper your Mac with a Targus case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. (accessories) \$68. Full Mac line available in black. Some styles available in blue, burgundy, and platinum. Premium line now available.

#### Inside Information (Microlytics)

Consider your Thesaurus extinct! Inside Information is the next Evolutionary step in language organization for the electronic age. This essential desk accessory contains over 65,000 words logically organized in a hierarchical dictionary containing seven general word classes broken down into respective sub classes, categories and subcategories. Access information by scrolling through, clicking and expanding on topics organized in four logical formats. Perfect for research writing or boning up on topical "Buzz" words for presentations. (desk accessories). \$69.



#### Nolo Press

For The Record .....	29.
WillMaker .....	32.
<b>Reality Technologies</b>	
Wealthbuilder .....	165.
<b>ShopKeeper Software</b>	
Bill-It 2.0 .....	99.
<b>Softview</b>	
MacInTax Federal '89 - 1040 .....	65.
State supplements .....	ea. 56.
<b>Survivor</b>	
MacMoney 3.5 .....	59.

#### BLANK MEDIA

##### B.A.S.F. made in U.S.A.

DS/DD (box of 10) .....	14.
DS/High Density (1.44 Meg) .....	24.
<b>Sony</b>	
DS/DD (box of 10) .....	13.
DS/HD (1.44 mb) .....	24.

#### BUSINESS & PRESENTATION

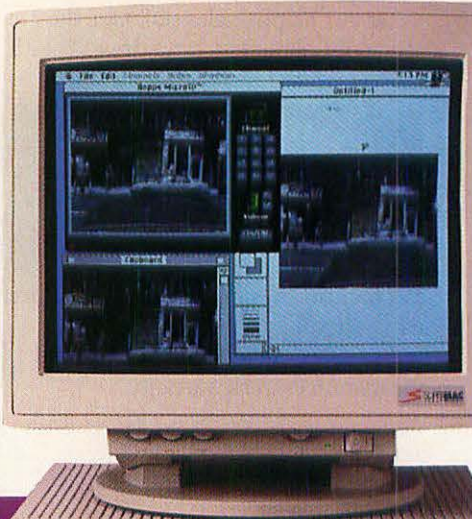
<b>A Lasting Impression</b>	
ResumExpert (word vers.) .....	39.
Cover Letters or Students .....	ea. 39.
Managers or Sales & Marketing ..	ea. 39.
Healthcare or Finance & Banking ..	ea. 39.
Education or Glamour Profs. ....	ea. 39.
Comp. Sciences & Engineering .....	39.
<b>Adobe Systems, Inc.</b>	
TrueForm SetUp .....	225.
<b>AEC Management Systems</b>	
FastTrack Schedule .....	115.
<b>Aldus</b>	
Persuasion 2.0 .....	329.
<b>Clarisc</b>	
MacProject II .....	365.
SmartForm Designer w/Assistant ....	289.

#### ACCOUNTING & PERSONAL FINANCES

<b>Aatrix</b>	
Checkwriter II .....	37.
Payroll 3.5 .....	109.
Payroll PLUS or TimeMinder .....	175.
<b>Intuit</b>	
Quicken 1.5 .....	35.
<b>Layred, Inc.</b>	
at Oncel .....	285.
<b>MECA</b>	
Managing Your Money .....	122.
<b>Monogram</b>	
Business Sense .....	269.
Dollars and Sense .....	81.

#### DigiVideo (Aapps)

Get a window on the world from your Mac II desktop! View real time TV and video from a window in your Mac screen. Use the graphic displays in the window to adjust contrast and audio volume while accessing up to 98 cable channels. Monitor output from camcorders, VCR's, etc. Then grab frames to copy & paste into any Mac document including Hypercard stacks. Perfect for monitoring security cameras or running training tapes. (hardware) \$415.





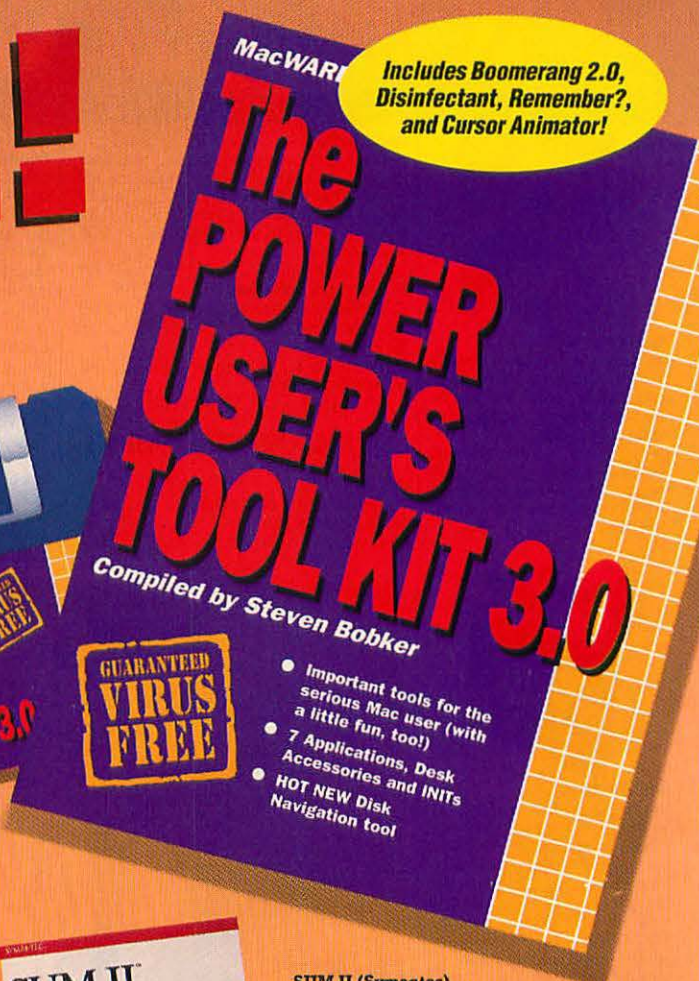
# FREE!

If you found the first two versions of the popular Power User's Tool Kit useful, you'll be delighted to know that the very latest version, 3.0, is now available.

The new edition includes **BOOMERANG 2.0**, an ingenious utility, which makes it much easier to use the SF Dialog (the dialog box that appears when you choose Open or Save from the file menu).

You'll also find the latest version of **DISINFECTANT** (anti-viral freeware) and **REMEMBER?**, a handy reminder of the day's events when you start up your Mac.

The **POWER USER'S TOOL KIT 3.0** is **FREE** from MacWAREHOUSE when you order from us. If you want the disk, you pay only \$1.50 for shipping and handling. The programs are shareware, so you can try them free of charge. If you wish to continue using them, some authors ask that you pay a fee (\$10-\$35). Many of the programs are absolutely **FREE**. All of the details are explained on the disk, which is yours to keep.



#### WIN A TRIP TO LONDON!

There's still time to enter our latest contest and win an all-expenses-paid trip to the MacUser U.K. Show in London, November 7-10, 1990. Your name is automatically entered in the drawing when you order from MacWAREHOUSE. Or, just fill out and mail the entry coupon below.

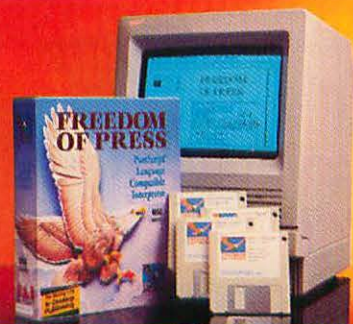
**FREE CATALOG!** You'll also receive the very latest edition of the MacWAREHOUSE catalog. Hundreds of new products, product reviews and updates — plus answers to your questions about compatibility, copy protection and features.



#### Freedom of Press 2.1a

(Custom Applications, Inc.)

Print PostScript language files using more than 50 different printers and film recorders. In combination with your favorite desktop publishing, graphics, drawing, painting and word processing software, Freedom of Press allows you to print PostScript language files, including support for 24 bit continuous tone color images. Complete with 35 scalable and rotatable outline fonts and drivers for all supported printers. Requires Macintosh SE30, II, IIfx, IIfx or IIfx. (utility) \$259.

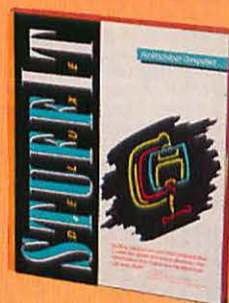


#### SUM II (Symantec)

Need urgent disaster relief? Before you summon the National Guard call up SUM II. SUM II (Symantec Utilities for the Mac) includes a variety of essential hard disk utilities to keep your Mac on track. Just pick the appropriate utility from SUM II's menu and the program does all the rest. Employ any number of powerful functions from data backup, recovery, and encryption, to hard disk optimization and tools to diagnose and repair files. (utility) \$99.

#### StuffIt Deluxe (Aladdin Systems, Inc.)

StuffIt Deluxe is the newest generation of the industry-standard compression, encryption, and archiving application. An easy-to-use interface and one-step QuickStuff/QuickUnStuff features allow beginners to benefit immediately. With over 75 new features, it employs many new state-of-the-art compression (including file-specific optimizers) and new security methods. Multiple archives can be opened and manipulated in a Finder-like fashion (with sorting, copying, renaming, or deleting). ViewIt brand viewers, a complete HyperTalk-like scripting language, and IBM-PC support (with dearc and unzip) are included. (utility) \$63.



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(1-800-ALL-MACS)

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When you order by phone or mail, you are automatically entered in the drawing. You can also mail this coupon or call our contest entry line. 1-800-367-0787. (In CT., call 1-203-852-8968)

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# FROM MacWAREHOUSE



## FastForms 2.0

Because you don't get a second chance to make a first impression. This powerful forms management system quickly creates, customizes, and prints professional quality custom business forms. Import and export data into user defined fields to perform automatic calculations. (business) \$89.



## White Knight 1.1

Successor to the legendary Red Ryder. New features list is more than 20 pages long! The 270+ pg. manual has plenty of tips to help beginners communicate like the pros. Comes bundled with Oktyo, a revolutionary Mac-to-Mac file transfer program. Free subscription to GENIE network provided. (communications) \$85.



## QuadLYNX Trackball

Uses Honeywell aerospace technology to give precise fingertip control over cursor movement. This device offers much greater precision in cursor placement. Just spin the trackball and the cursor flies across the screen to where you want it. Great for desktop publishing, CAD/CAM, graphics and arcade games. (input) \$59.



## Publish-It! Easy

Combines the sophistication of Publish-It! with 10 Desktop Publishing firsts, and an easier-than-ever User Interface. Newcomers to Desktop Publishing can produce powerful documents everytime. Includes, word processor, 112,000 word spell checker, 240,000 word thesaurus, advanced page layout, drawing and painting tools. (desktop publishing) \$112.

## JAM Software

Smart Alarms & Appt. Diary .....	49.
Smart Alarms (1 - 4 users) .....	99.
Smart Alarms (5 - 8 users) .....	149.
Smart Alarms (9 - 15 users) .....	199.
Smart Alarms (16-25 users) .....	299.

## Microlytics

Inside Information .....	69.
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## Preferred Publishers

DAtabase 1.5 .....	68.
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Vantage 1.5 .....	52.
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## Solutions

SmartScrap & The Clipper 2.0 .....	45.
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## Vision Software

Form Layout .....	35.
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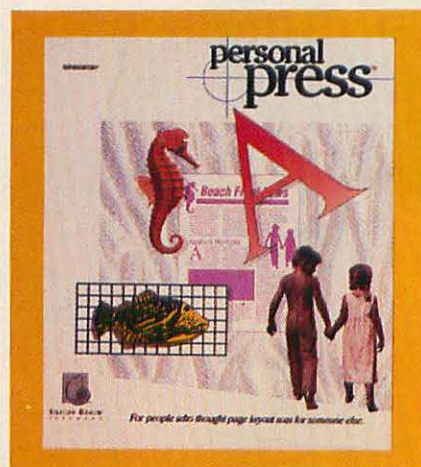
## DESKTOP PUBLISHING

### Aldus

PageMaker 4.0 or PrePrint .....	499.
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### Data Translation

PhotoMac .....	609.
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## Personal Press (Silicon Beach)

Personal Press creates professional layouts for you. Forget the long, steep learning curve, because Personal Press has AutoCreate to assemble stories and graphics into templates. It includes a full-featured word processor with spelling checker and thesaurus, controls for scanned images, spot color separations, posted notes, link navigator, extensive page previewing, and on-line help. (desktop publishing) \$199.

## Letraset

ColorStudio .....	579.
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FontStudio .....	459.
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ImageStudio or Ready,Set,Go! .....	275.
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## Olduvai

Read-It! 2.1 (OCR) .....	278.
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Read-It! Personal 2.0 .....	139.
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Read-It! TS (ThunderScan) .....	79.
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## Quark

QuarkStyle .....	169.
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Xpress .....	469.
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## Silicon Beach

Personal Press .....	199.
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## Spinnaker/Springboard

PLUS .....	115.
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Springboard Publisher II .....	109.
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## TimeWorks

Publish-It! Easy .....	112.
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## DISK DRIVES/BOARDS

### CMS

MacStack 20 Meg .....	459.
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MacStack 30 Meg .....	499.
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MacStack 45 Meg .....	599.
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MacStack 60 Meg .....	649.
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MacStack 80 Meg .....	769.
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MacStack 44 Meg Removable .....	839.
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## Cutting Edge

800K External Floppy Drive .....	149.
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SyQuest Removable 45 Meg .....	699.
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Under the Mac 20 Meg .....	339.
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Under the Mac 30+ Meg .....	379.
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Under the Mac 45+ Meg .....	435.
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Under the Mac 60+ Meg .....	469.
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Under the Mac 80+ Meg .....	529.
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## Dayna Communications

Dayna File Single 360K (5 1/4") .....	525.
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Dayna File Dual 360K & 1.44M .....	749.
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## Fujitsu

800K Disk Drive .....	159.
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## Kenneth Technology

Drive 2.4 .....	329.
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Rapport .....	199.
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## Peripheral Land, Inc.

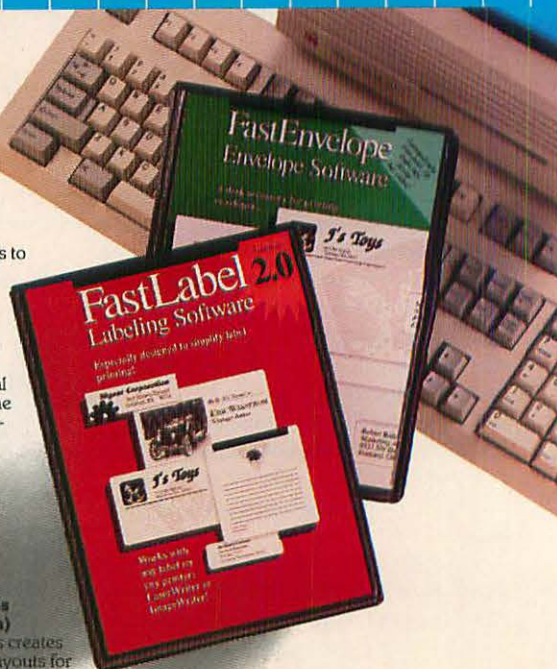
Infinity Dual Turbo .....	1875.
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## FastLabel 2.0 (Vertical Solutions)

Stick it to the chore of simple label printing in three easy steps! Import addresses, lists and graphics then use FastLabel's preformatted templates (or create your own) to produce everything from disk, V.C.R. and cassette labels to name badges, signs and more. (business) \$89.

## FastEnvelope

This handy DA lets you import lists and graphics to print eye-catching envelopes, then adds postal bar codes saving you time and money on bulk mailings. (business) \$50.



## Help Software, Inc.

Desktop Help for Excel .....	49.
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## Learning Company

Math Rabbit or Reader Rabbit .....	ea. 30.
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## Nordic Software (full line available)

MacKids Turbo Math Facts .....	28.
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MacKids Preschool Pack .....	35.
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## Penton Overseas

VocabuLearn French, Spanish, German, Italian, Russian, or Hebrew .....	ea. 35.
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VocabuLearn Japanese .....	35.
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## Voice & Video Instruction Videos

HyperCard or Pagemaker 3.0 .....	ea. 35.
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Word 4.0 Video Tape .....	35.
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## ENTERTAINMENT

### Artworx

Bridge 6.0 .....	24.
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Daily Double Horse Racing .....	19.
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### Broderbund

Ancient Art of War At Sea .....	27.
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Shufflepuck Cafe .....	24.
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Where in the World is Carmen .....	29.
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## EDUCATIONAL/PERSONAL

### Beacon Technology

GEMS of the Word .....	25.
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### BrightStar

Alphabet Blocks .....	30.
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Talking Tiles .....	26.
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### Davidson

Math Blaster Mystery .....	26.
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Speed Reader II .....	26.
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### Fair Tide Technologies

Navigate! mono. ....	199.
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## The "ULTIMATE" SE Carrying Case (I/O Design, Inc.)

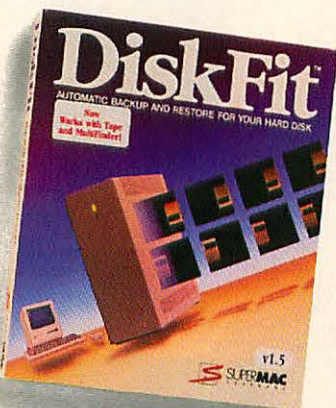
The "ULTIMATE" SE Carrying Case is designed with the same high quality standards as other MacLuggage products. This case offers internal, padded compartments for ANY Macintosh keyboard, mouse, external hard disk and cables. It also features 2 additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy DuPont Cordura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac. (accessories) \$79.





# MORE FOR YOUR MONEY...

<b>Deltapoint</b>	
Delta Graph 1.5 .....	99.
Imagine That!	
Extend .....	339.
<b>Informix</b>	
WingZ 1.1 .....	245.
<b>Kaetron</b>	
Top Down 2.0 .....	229.
<b>Microsoft</b>	
Excel 2.2 or PowerPoint 2.1 .....	ea.245.
The Microsoft Office .....	525.
Works 2.0 .....	185.
<b>Portfolio Systems</b>	
Dynodex-w binder & paper .....	95.
Paper .....	14.
<b>Power Up</b>	
Address Book Plus .....	53.
Address Book Plus w/Binder .....	99.
Calendar Creator .....	38.
FastForms! .....	89.
Letter Writer Plus .....	53.
<b>Preferred Publishers</b>	
Direct Mail .....	54.
<b>ProPlus</b>	
Wall Street Investor .....	449.
<b>Softstream International</b>	
Endeavour Planner .....	95.



## DiskFit 1.5 (SuperMac)

A handy utility for backing up your hard disk on a series of floppies. It saves time because it backs up only those files which have changed since the last backup. DiskFit can verify each floppy after copying files onto it, so you know that your files are safe. DiskFit also discards old versions of files so your backup set doesn't keep growing. Version 1.5 supports a variety of cartridge tape drives, including the Apple tape backup system. (utilities) **\$58.**

<b>Symantec</b>	
More 3.0 .....	269.
<b>Symmetry</b>	
KeyPlan .....	275.
<b>SYNEX</b>	
MacEnvelope 5.0 .....	79.
MacEnvelope Plus .....	219.
MacPhonebook .....	51.
<b>Vertical Solutions</b>	
FastLabel 2.0 .....	89.
FastEnvelope .....	50.
<b>Zedcor</b>	
DeskWorks .....	229.

## CAD/CAE

<b>Clarix</b>	
ClarixCAD .....	579.
<b>Graphsoft</b>	
MiniCad+3.0 .....	Call.
<b>Innovative Data Design</b>	
MacDraft .....	175.
<b>Strata</b>	
StrataVision 3D .....	375.

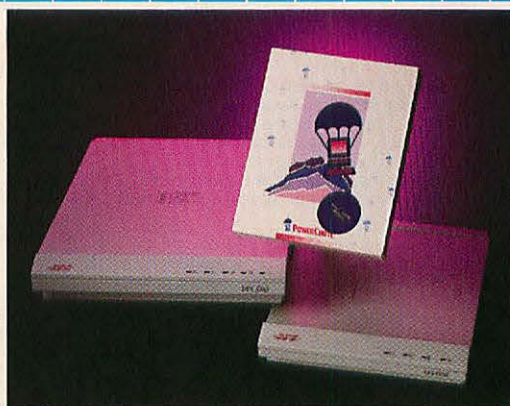
## COMMUNICATIONS & NETWORKING

<b>CE Software</b>	
In/Out (1 to 5 Users) .....	128.
QuickMail 2.2 (1-10 Users) .....	319.

## 110 SE UPS (American Power Conversion)

Fits neatly under your Mac and provides up to 20 minutes of clean power. Built-in rechargeable battery prevents data loss and equipment damage. Protects against surges, spikes and power line noise. (accessory) **\$219.**  
**Power Chute**  
 Upon power failure Power Chute alerts all network users and initiates a graceful shutdown of the AppleShare Network. Communicates with a signalling American Power Conversion UPS (such as the 110SE or 370ci). (utility) **\$67.**  
**370 ci UPS**  
 Power protection for the Mac II family. With the 370ci Uninterruptible Power Supply, you'll have enough backup power to operate your Mac II system for 15 minutes. That includes a typical Mac II with a color monitor and an internal hard disk drive. (accessory) **\$315.**

<b>CompuServe</b>	
CompuServe Navigator 3.0 .....	49.
CompuServe Subscription Kit .....	24.
<b>DataVIZ</b>	
MacLink Plus w/Cable 4.1 .....	119.
MacLink Plus/Translators 4.1 .....	99.
<b>Dove</b>	
FastNet SCSI .....	749.
FastNet III SE or SE/30 .....	ea. 375.
<b>Dow Jones</b>	
News/Retrieval Membership .....	24.
<b>Farallon</b>	
Timbuktu 3.1 .....	95.
Timbuktu Remote .....	123.
TrafficWatch .....	125.
PhoneNET Repeater .....	315.
PhoneNET Star Controller .....	825.
<b>FreeSoft</b>	
White Knight 11.0 .....	85.
<b>Infosphere</b>	
Liaison .....	175.
<b>InSignia Solutions</b>	
Soft PC (Mac II) .....	245.
<b>Microcom Software</b>	
Carbon Copy Mac .....	119.
<b>Prodigy</b>	
Mac Starter Kit .....	27.
<b>Prometheus</b>	
MacKNOWLEDGE .....	85.



## Software Ventures

Microphone II v.3.0 .....	215.
<b>Solutions</b>	
FaxGate Plus .....	239.
MailMaker (5-Pack) .....	117.
<b>TOPS</b>	
InBox Plus 3.0 .....	649.
NetPrint or Repeater .....	119.
FlashCard .....	155.
TOPS 3.0 Network Bundle .....	189.
TOPS DOS Network Bundle .....	165.
<b>Traveling Software</b>	
Lap Link .....	81.
Lap-Link III Connectivity Pac .....	119.
Lap-Link III Network Pac .....	185.

## DATABASE SOFTWARE

<b>Acius</b>	
4th Dimension 2.0 .....	469.
FileForce .....	249.
<b>AEC Management Systems</b>	
AEC Information Manager .....	409.
<b>Blyth</b>	
Omnis 5 .....	375.
<b>Clarix</b>	
FileMaker II .....	219.
FileMaker Pro .....	Call.
<b>Fox Software</b>	
FoxBASE+Mac .....	292.
<b>Odesta</b>	
Double Helix III .....	389.
GeoQuery .....	229.
<b>ProVUE</b>	
Panorama .....	257.

## DESK ACCESSORIES

<b>Casady &amp; Greene</b>	
QuickDEX .....	31.

■ VISA and MASTERCARD accepted. No surcharge.	<b>MWGO</b>
■ Your credit card will not be charged until your order is shipped.	
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■ Corporate purchase order accepted subject to credit approval.	
■ All products are covered by a 120 day limited warranty.*	
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■ Orders placed by 12:00 Midnight (EST) (weekdays) for "in stock" items ship same day (barring system failure, etc.) for overnight delivery.	
■ C.O.D. orders ship via UPS (Blue Label) if you are more than 2 days from us via UPS Ground. Charge is \$6 including shipping.	
■ Alaska, Hawaii, outside continental U.S., APO/FPO call 201-367-0440 for information.	

\*Defective software replaced immediately. Hardware replaced or repaired at our discretion.

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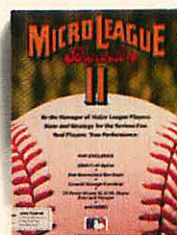
## Metamorphosis

Now you can capture the outlines of printer-resident post script fonts from your laser printer and transform them into editable formats. Use them to create special effects in such drawing programs as Aldus FreeHand and Adobe Illustrator as well as create New Post-Script fonts with Altsys Fontographer. (fonts) **\$149.**



## Easy Color Paint

Power Packed Palette! Jammed with features, Easy Color Paint delivers thrills and excitement to any would-be Picasso within mouse-reach of your Mac. Includes 17 tools, 256 colors, user defined patterns, multiple color palettes, coloring modes and much more. (graphics) **\$45.**



## MicroLeague Baseball II

With MicroLeague Baseball II at bat you'll manage to have the time of your life! MicroLeague provides you with superb sound & graphics as well as real players and the statistics they accumulate to make heads-up management decisions on your way to the pennant. (entertainment) **\$38.**



## CanOpener 1.1

Information retrieval utility for the Mac. Search anywhere, and retrieve just about anything; including text, pictures and sounds. Locates text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in its library, so the next time you need it, it's just a click away. (utility) **\$64.**



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**Metro ImageBase Electronic Art (Metro ImageBase)**  
High quality 300 dpi electronic art from one of the world's leading publishers of ready to use art. Enhance brochures, menus, reports, newsletters and presentations. One large image per file - 100 per package. Packages available: Newsletter Maker, Business Graphics, Computers & Technology, ReportMaker, Borders & Boxes and 9 others. (graphics) **\$85. each**

## Fonts

**Adobe**  
Adobe Type Manager 1.2 ..... 55.  
Adobe Type Reunion ..... 39.  
Plus Pack ..... 109.  
TypeAlign ..... 59.  
Type Set 1 or Type Set 2 ..... ea. 58.  
Fonts (full line avail.) ..... Call.  
**Altsys**  
Fontastic Plus 2.02 ..... 52.  
Fontographer 3.05 ..... 249.  
Metamorphosis ..... 149.  
The Art Importer 2.0 ..... 89.  
**Letraset**  
LetraStudio ..... 275.  
LetraFonts (various) ..... ea. 69.  
**Tactic Software**  
ArtFonts Vol. 1, 2 or 3 ..... ea. 55.

**Digital Vision**  
Computer Eyes B&W ..... 199.  
Computer Eyes Pro Color ..... 349.  
**Dream Maker**  
Clippings, Business Images ..... 69.  
MacGallery ..... 27.  
**Electronic Arts**  
Studio/1 ..... 96.  
Studio/8 ..... 295.  
Studio/32 ..... Call.  
**Graphsoft**  
Blueprint ..... 219.  
**Innovative Data Design**  
Dreams ..... 325.  
**Letraset**  
Shapes ..... Call.  
**MacroMind**  
MacroMind Director ..... 439.  
**Metro ImageBase (Full Line Available)**  
Art Deco or ReportMaker ..... ea. 85.  
Newsletter Maker or Business ..... ea. 85.  
**Mindscape**  
ZING ..... 125.  
**Multi Ad Services**  
Multi-Ad Creator ..... 865.  
ProArt: Bus., Sports or Holidays ..... ea. 95.  
**Paracomp**  
Swivel 3D 1.1 ..... 295.

**ResumExpert (A Lasting Impression)**  
Whether you're seeking an entry-level position or an executive's corner office, the ResumExpert Software Series is the next best thing to knowing the boss. Professionally written and fully-formatted Microsoft Word templates let you easily create eye-catching resumes. MacUser 10/89 awarded ResumExpert 4 mice and raved about the "excellent manual" that includes expert writing tips. MacUser 12/89 rated it as one of the Top 200 Software Programs of 1989. See line listings for all 10 editions. (business) **\$39. each**



## Graphics & Design

**3G Graphics**  
Graphics & Symbols 1 ..... 50.  
Business 1 or Accents & Brdrs 1 ..... ea. 65.  
**Adobe**  
Illustrator 88 1.9.3 ..... 275.  
Photoshop ..... 499.  
Smart Art I, II, III, or IV ..... ea. 84.  
Streamline ..... 229.  
**Aldus**  
Freehand 2.0 ..... 329.  
**Aperture Technology**  
Aperture Visual Information Mgr. .... 729.  
**Broderbund**  
Drawing Table ..... 79.  
TypeStyler ..... 119.  
**Claris**  
MacDraw II ..... 289.  
MacPaint 2.0 ..... 93.  
**Creative Software**  
Easy Color Paint ..... 45.  
**Deneba**  
Canvas 2.1 ..... 189.  
Ultra Paint ..... 125.

**Carbon Copy Mac (Microcom)**  
Run the office from your easy chair! This remote control software package that allows one Mac to remotely operate another Mac's peripherals, screen, keyboard and mouse. Works through LocalTalk LANS or modems. Transfer files without using EMAIL, access messages remotely, or "borrow" expensive peripherals such as CD-ROM drives and fax modems. Unparalleled tool for training demonstrations. Offers three levels of password security. Get a second node FREE through manufacturer's Special Introductory Offer. (communications) **\$119.**

**Silicon Beach**  
Digital Darkroom ..... 249.  
Super 3D 2.0 ..... 339.  
SuperPaint 2.0 ..... 125.  
**SoftStream**  
Relational Objex ..... 150.  
**Somak**  
LaserArt CD-ROM #1 or #2 ..... 59.  
**Strata**  
StrataVISION 3d ..... 375.  
Strategic Mapping, Inc. (Select Micro) Map Maker 4.0 ..... 295.  
**Studiotechnics**  
Colorset 1.5 ..... 229.

**WIZ (CalComp)**  
"Mighty Mouse!" Not just an ordinary mouse. WIZ offers a short cut through tedious key-stroke and menu dragging steps. Use WIZ's 35 plus color-coded templates (purchased separately) to instantly access software commands drastically reducing the time it takes to master DTP, graphics, and office automation software. For 1000dpi accuracy in CAD and graphics programs use WIZ's cross hair pointer and intelligent pad for screen to pad scaling. (input) **\$159.** WIZ's optional pen can unleash your creative genius. (input) **\$57.**



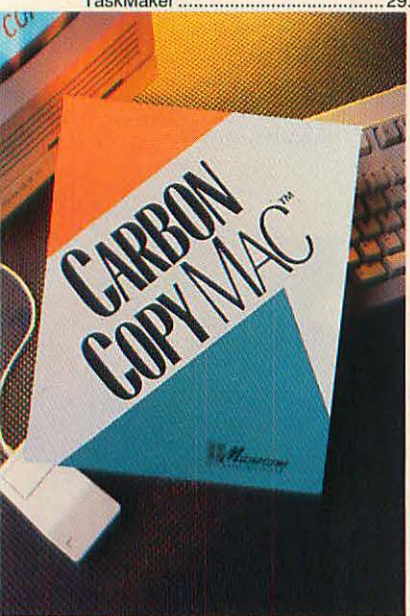
**Utility Pac**  
Give Your Mouse a House! Save valuable desktop space. Store your Mouse, Mouse Pad and Diskettes conveniently on the side of any monitor. Platinum color. (accessories) **\$11.**  
**HardTops for keyboards**  
You'll flip your lid over these durable covers! Protect keyboards from unexpected spills and falling objects with impact-resistant ABS plastic. By Basic Needs. Platinum color. (accessories) Starting at **\$15.**



**AutoSave II**  
The AutoSave DA is now the AutoSave II CDEV (Control Panel Device). Just drag it into your system folder, and AutoSave II will issue a periodic Save Command to the running application. You can set the interval between saves from one to 99 minutes. (utility) **\$29.**



**BackMatic**  
BackMatic automatically backs up your files each time you shut down your Mac. Install this handy INIT in your system Folder, and you'll never need to remember to make a backup again. You can configure it to backup only the files you've changed, or all your most important files. (utility) **\$50.**





# MacWAREHOUSE 1-800-255-6227



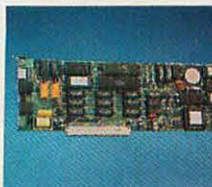
## Omnis 5 (Biyth)

Utilizes the graphical interface, enhanced memory, storage and color capabilities for both the Macintosh and IBM PS/2 hardware. Produce data files that can be shared between the Macintosh and IBM PC. Multi-user capabilities gives simultaneous data access from both platforms. CL/1 and SQL connectivity allows access to data from the VAX or IBM mainframe. HyperCard is fully supported. Also included: Omnis 5 Express which allows beginners to outline requirements and build their first applications. (database) \$375.



## Practica Musica 2.2

Meet your personal music tutor. With Practica Musica you'll have fun while learning to read and write music. Develop your ear for intervals, chords, melody and rhythm. Called "a sensational learning program" by MacUser. Includes a coordinated textbook and a wide range of activities to stimulate beginners and advanced students. MIDI compatible. (music) \$69.



## ProModem 2400MII

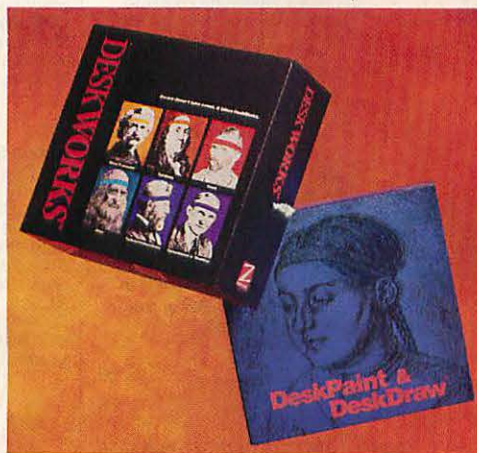
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PixelPaint Professional .....	389.
<b>Tactic Software</b>	
Art Clips Vol. 1 or Vol. 2 .....	Call.
<b>Zedcor</b>	
DeskPaint & DeskDraw .....	115.

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MicroTV .....	275.
<b>Cutting Edge</b>	
Two Page 19" Monochrome Monitor .....	959.
<b>General Computing Company</b>	
WriteMove Ink Jet Printer .....	575.
<b>Magnavox</b>	
Color Monitor 14" .....	535.
<b>Microtek</b>	
Microtek MSF-300GS Scanner .....	1589.
Microtek MSF-300Z Scanner .....	1998.



## NEC

Intersect CDR-35 .....	419.
<b>Qume</b>	
Crystal Print Publisher .....	2900.
<b>Seikosha America</b>	
Seikosha Printer (dot-matrix) .....	235.
<b>Sharp</b>	
The Wizard .....	229.
<b>ThunderWare</b>	
LightningScan 400 .....	385.
ThunderScan Plus .....	199.

## HYPERWARE

<b>Bantam</b>	
Complete HyperCard Handbook .....	22.
<b>Beacon Technologies</b>	
HyperBible International Version .....	175.
HyperBible King James Version .....	145.
<b>Bright Star Technology</b>	
HyperAnimator 1.5.1 .....	98.
interFACE .....	229.
<b>DataDesk International</b>	
HyperDialer .....	29.
<b>ICOM Simulations</b>	
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<b>Symmetry</b>	
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<b>TimeWorks</b>	
HyperWorks Organizer .....	57.

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Felix .....	127.
<b>Calcomp</b>	
WIZ Tablet .....	159.
WIZ Pen .....	57.
WIZ Templates .....	ea. 33.

## DeskWorks (Zedcor)

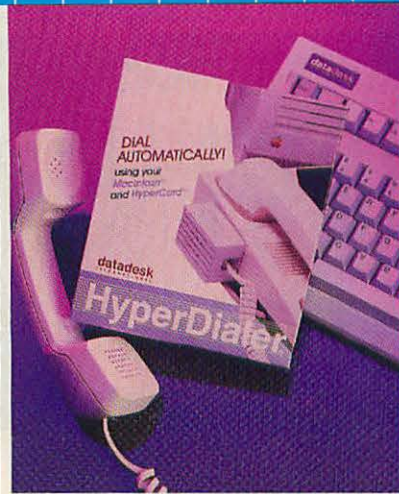
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DataDesk Switchboard .....	175.
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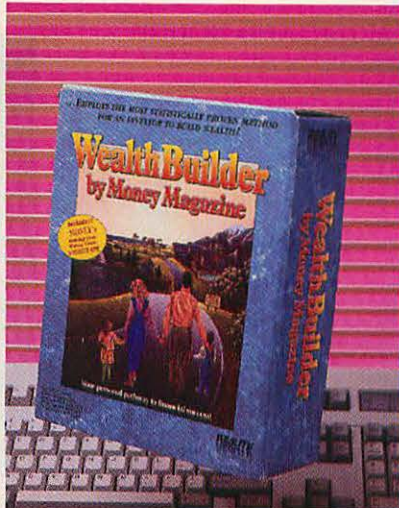
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The UnMouse .....	189.
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Cordless Mouse .....	95.
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A+ Mouse (SE/II) .....	75.
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Mouse Master .....	57.
<b>Summagraphics</b>	
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## LANGUAGES

### Digitalk, Inc.

Smalltalk/V MAC .....	125.
<b>Microsoft</b>	
QuickBasic .....	64.
<b>Shana Corporation</b>	
Inside Out .....	369.
<b>Symantec</b>	
THINK'S C 4.0 .....	168.
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MacSnap 548S ..... 499.

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InterFax 12/48 ..... 265.  
InterFax 24/96 ..... 419.

### Best Data Products

SmartOne 2400/1200 ..... 145.

### Dove

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DoveFax Networkable desktop ..... 375.  
DoveFax Nubus ..... 449.  
Networkable Nubus ..... 749.

### Hayes

Smartmodem 2400 ..... 349.  
Smartmodem 9600 (V series) ..... 759.

### Prometheus

2400MFAX ..... 209.  
ProModem 2400 SE Int. .... 209.  
ProModem 2400M ..... 199.  
ProModem 2400M II ..... 205.  
Travel Modem ..... 205.

### Supra

Supra Modem 2400 ..... 129.

## MUSIC AND SOUND

### Altech

MIDI Interface ..... 59.

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Deluxe Recorder ..... 99.

### Farallon Computing

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Screen Recorder ..... 125.

### Passport Designs

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Passport MIDI Interface ..... 89.



### Primera Software

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### Tactic Software

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### ASD Software, Inc.

FileGuard Extend (office 5-pak) ..... 309.

### Fifth Generation

Disk Lock ..... 106

### HJC/Microcom

Virex 2.3 ..... 52.

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MacSafe II ..... 107.

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non-volatile memory. Includes software and cable. (modems) \$145.

### Mainstay

AntiToxin ..... 59.

### Symantec Corporation

S. A. M. .... 68.

## SPELLING/DICTIONARY THESAURUS CHECKERS

### Deneba Software

BigThesaurus ..... 64.

Spelling Coach Pro 3.1 ..... 125.

### Electronic Arts

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### Lexpertise

MacProof 3.2.1 ..... 115.

### Casino Master (Centron)

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### Microlytics

Electronic Word Finder ..... 59.

Word Finder 2.0 ..... 34.

### Sensible Software

BookEnds or Sensible Grammar ..... 53.

## STATISTICAL ANALYSIS

### Abacus Concepts

StatView II ..... 279.

StatView SE+Graphics ..... 199.

### D2 Software

MacSpin 2.0 ..... 189.

### Wolfram Research

Mathematica (SE) ..... 450.

## UTILITIES

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CanOpener 1.1 ..... 64.

### Affinity

Tempo II ..... 99.

### Aladdin Systems Inc.

Programmer's Assistants ..... 75.

### Shortcut

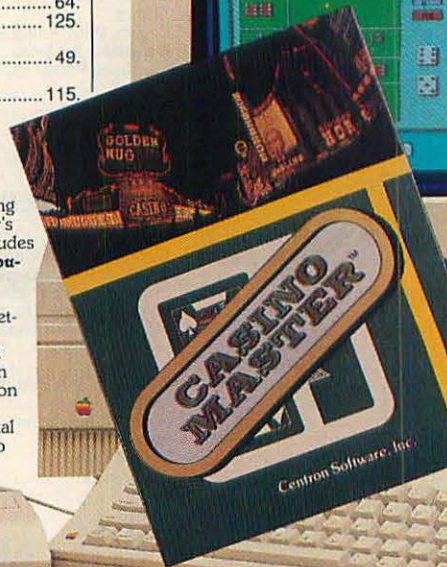
StuffIt Deluxe ..... 63.

### ALSoft

DiskExpress II ..... 57.

### MultiDisk

Master Juggler ..... 64.





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## American Power Conversion

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## CE Software

DiskTop 4.0 or QuicKeys 1.2 ..... ea. 64.

## Caere

OmniPage ..... 545.

## Central Point Software

Copy II Mac ..... 23.

Mac Tools Deluxe ..... 75.

## Custom Applications

Freedom of Press 2.1a ..... 259.

## Dantz Development

Retrospect ..... 149.

## Dayna Communications

DOS Mounter ..... 55.

## Fifth Generation

FastBack II ..... 106.

PowerStation 2.5 ..... 33.

Pyro ..... 22.

Suitcase II ..... 43.

## ICOM Simulations

On Cue ..... 35.

## Insight Development

MacPrint ..... 95.

## Magic Software

AutoSave II ..... 29.

BackMatic ..... 50.

POWERIcons or POWERmenus ea. .... 39.

## Mainstay

Capture 2.0 ..... 49.

## Microlytics

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## Olduvai

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MultiClip ..... 69.



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**CONTEST RULES** 1. Entries must be received on or before 8/31/90. 2. Winner selected in random drawing by attorneys for MicroWarehouse Inc. (MWH), whose decisions are final. 3. Concorde trip to London and MacUser UK show subject to availability. MWH reserves the right to substitute wholesale cash value up to \$8000. 4. Winner responsible for taxes. 5. Odds of winning depend on number of entries. 6. MWH will announce the winner on or around 9/30/90. Winner notified by mail. Dates subject to change at the discretion of MWH. If unable to contact winner, an alternate will be selected by random drawing. 7. Contest open to U.S. residents, except where prohibited by law. Employees of MWH and suppliers not eligible. 8. Prize: one round trip ticket to London, including NY-London by Concorde. Hotel accommodation for duration of MacUser UK Show, November 1990. \$500 cash for miscellaneous expenses.



## ON Technology

On Location ..... 75.

## Peter Norton Utilities

Norton Utilities for the Mac ..... 75.

## Preferred Publishers

Exposure ..... 52.

## Software Innovations

HandOff ..... 32.

## Somak

ScriptEdit ..... 49.

SharpenUp! ..... 59.

## SuperMac

DiskFit 1.5 or SuperSpool 5.0 ..... ea. 58.

Sentinel 2.2 ..... 87.

SuperLaserSpool 2.0 (single user) ..... 87.

SuperLaserSpool (5-pack) ..... 289.

## Symantec Corporation

SUM II ..... 99.



## InBox Plus 3.0 (TOPS)

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## Tactic Software

FontShare 2.0 ..... 149.

Icon-It 2.0 ..... 45.

## WORD PROCESSORS & OUTLINERS

## Claris

MacWrite II ..... 145.

## Microsoft

Word 4.0 ..... 245.

## New Horizons Software

WordMaker ..... 65.

## T/Maker

WriteNow 2.0 ..... 119.

## WordPerfect Corp.

WordPerfect ..... 229.

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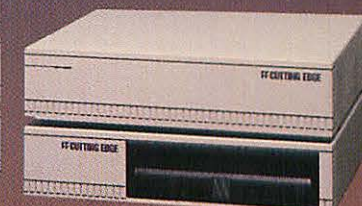
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# THE MAGNETIC-FIELD MENACE

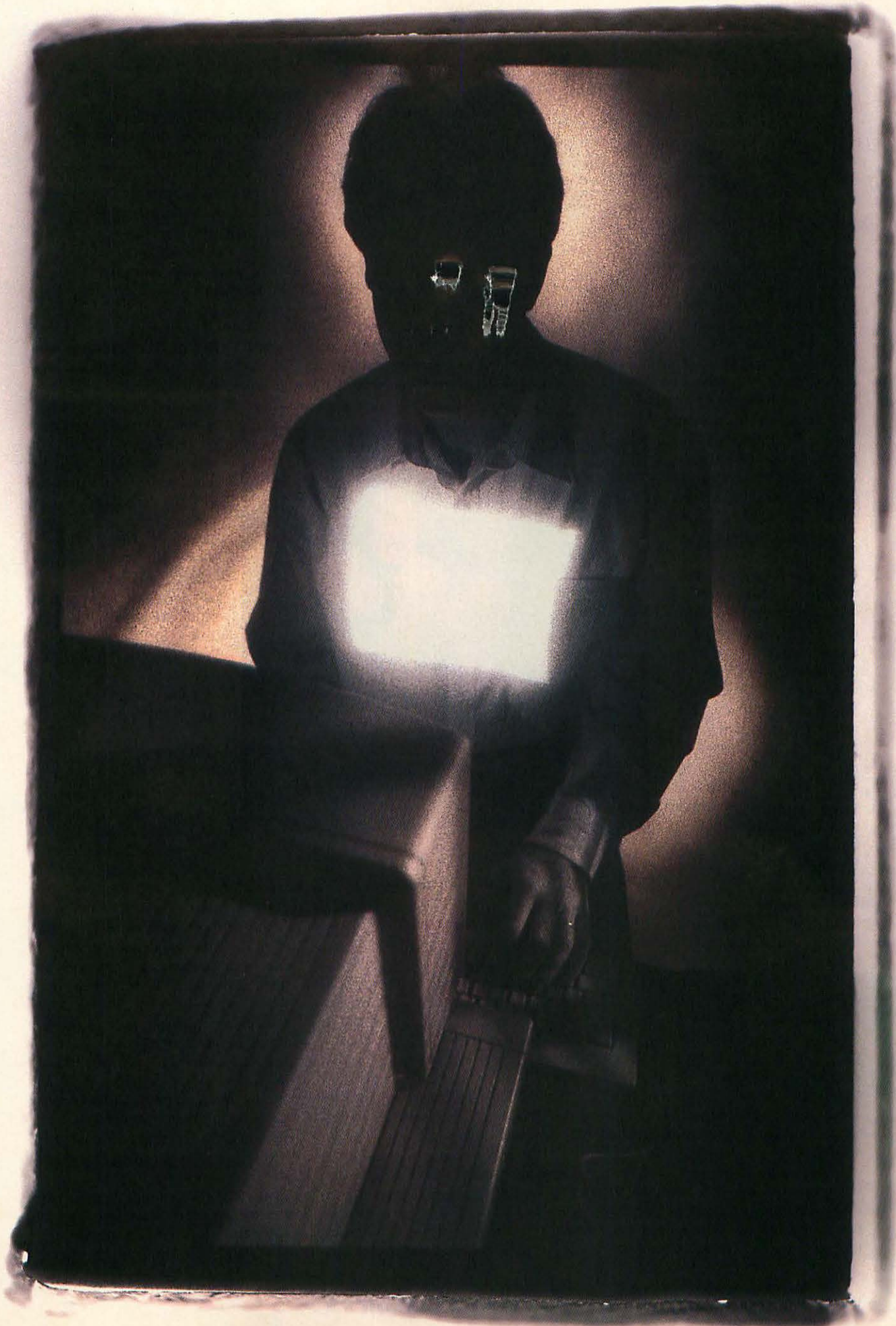
**A**s the new decade begins, most Macintosh users and other inhabitants of the vast computer community have become aware that serious questions are being raised about the potentially harmful health effects of electromagnetic emissions from display monitors. However, the issue has been so shrouded by denial on the part of manufacturers and employers, and addressed with such incompetence by state and federal regulatory agencies, that computer users scarcely know what to think about it, who to turn to for reliable information, or how to protect themselves. Meanwhile, industry, government, and the medical and scientific community are mounting belated attempts to study the problem and reach some consensus about how to deal with it.

Since disease does not develop by consensus but by immutable laws of biology, it seems prudent to review what is known about the harmful biological effects of low-level electromagnetic emissions from display monitors,

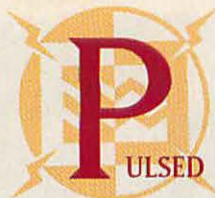
Computer  
monitors may  
pose a  
very real  
threat  
to users

BY PAUL BRODEUR









## PULSED EXTREMELY-LOW-FREQUENCY MAGNETIC-FIELD LEVELS OF MORE THAN 22 MILLIGAUSS HAVE BEEN MEASURED AT A DISTANCE OF 4 INCHES FROM THE APPLE 13-INCH COLOR MONITOR AND FROM E-MACHINES' COLORPAGE 15

power lines, and other sources—particularly magnetic-field emissions, which have been linked for more than ten years to the development of cancer—and to understand how this knowledge has been acquired and disseminated. It also seems sensible to determine the strength of magnetic-field emissions from monitors—something that has not been done with accuracy to date—and to relate these emissions, insofar as possible, with what is known about their potential for harm.

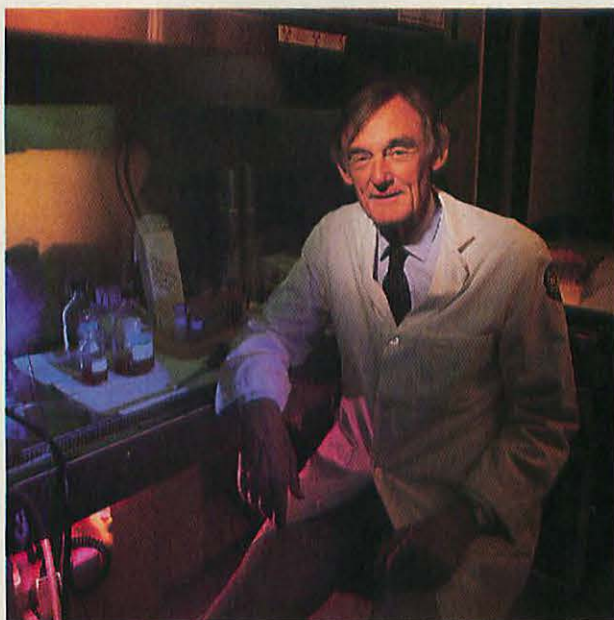
For this reason, *Macworld* has undertaken to conduct careful measurements of the strength of the magnetic fields given off by monitors that are commonly used with the Macintosh. The idea is to provide accurate readings so that Macintosh users can determine for themselves whether they wish to take protective measures in order to reduce their exposure to magnetic fields (see "At Arm's Length").

### First Suspicions

Radiation from computer terminals first became an issue in 1977, when officials of the National Institute for Occupational Safety and Health (NIOSH) measured emissions from several display monitors at the *New York Times*, where two young copy editors had developed incipient cataracts after working on the machines for periods of a year or less. The NIOSH officials reported that the electric-field and magnetic-field strengths of the VLF (very-low-frequency) radio-frequency radiation being emitted were too weak to be detected by their instruments at a distance of 4 inches. As it turned out, they were trying to measure the fields

in terms of milliwatts per square meter, even though VLF and ELF (extremely-low-frequency) fields can't be accurately measured in this manner.

Early in 1980, NIOSH officials measured VLF magnetic-field strengths of almost 9 milligauss (a gauss is a unit of strength of the magnetic field,



**W. ROSS ADEY**

*Associate chief of staff for research, Jerry L. Pettis Memorial Veterans' Hospital, Loma Linda, California*

and a milligauss is  $1/1000$  gauss) near the flyback transformers of several display monitors at newspapers in San Francisco and Oakland, California. The NIOSH officials discounted the health hazard of these fields, claiming that "there is no occupational standard for this frequency and these frequencies have not been shown to cause biological injury."

During the next two years, seven unusual clusters of birth defects and miscarriages involving women who operated video-display terminals (VDTs) were reported in Canada and the United States. Instead of taking

their own measurements of the machines in question, however, the health officials who investigated these cases relied on the flawed NIOSH reports and characterized each of the clusters as a chance occurrence. By this time, the regulatory officials and computer manufacturers of both nations seemed to be falling over one another in their haste to absolve computers of any blame.

In March of 1981, the director of Canada's Radiation Protection Bureau declared that VDTs "carry no radiation hazard." Similar claims were made before a congressional subcommittee

by the U.S. Food and Drug Administration's Bureau of Radiological Health and by the director of standards for IBM. In October of that year, a senior scientist at the Bell Telephone Laboratories in Murray Hill, New Jersey, declared that computer terminals "do not represent a health hazard from any radiation exposure caused by their use." (At the time, there were well over 100,000 computer terminals in operation in the Bell systems.)

### 60Hz Hazards Exposed

Unaccountably, no one in industry or government said a word about the pulsed 60Hz electric and magnetic fields that were being emitted by display monitors (see "Cathode-Ray Tubes Explained"), even though there were by then many studies in the medical literature to suggest

that the 60Hz alternating-current fields given off by power lines might be hazardous to health. Chief among these studies was one that had been published in March of 1979 in the highly respected *American Journal of Epidemiology* by epidemiologist Nancy Wertheimer and physicist Ed Leeper, who live in Boulder, Colorado. Wertheimer and Leeper had conducted an investigation showing that children in the Denver area who lived in homes near electric distribution wires carrying high current had died of cancer at twice the expected rate. (Since magnetic fields are produced by electric



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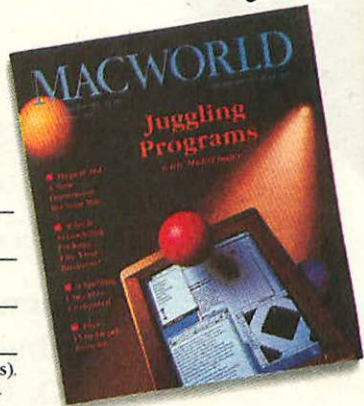
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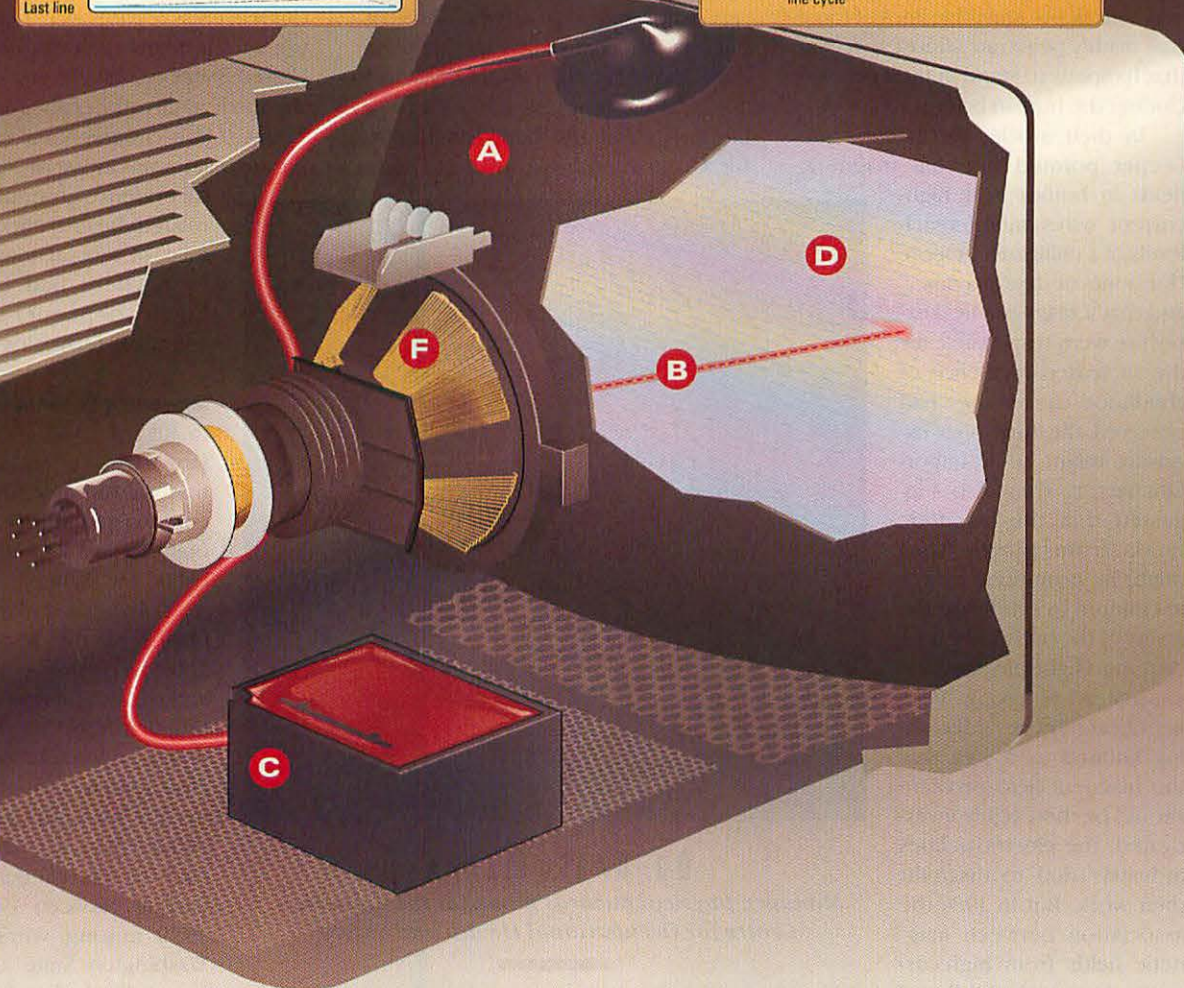
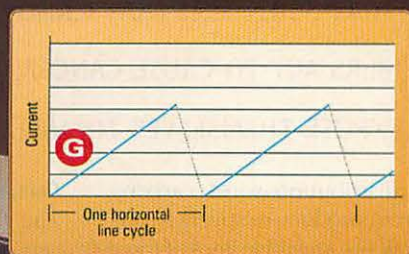
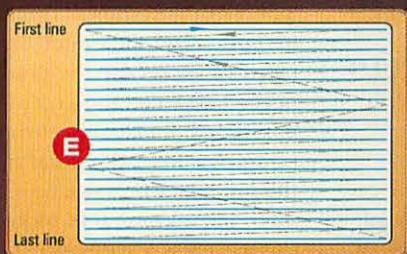
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# CATHODE-RAY TUBES EXPLAINED



Computer display monitors operate on much the same principle as television sets. An evacuated glass tube containing an electron gun, called the cathode-ray tube (CRT) (A), produces a narrow electron beam (B); a step-up transformer known as the flyback transformer (C) then accelerates and directs the beam toward the front of the tube. When the beam strikes the inner surface of the CRT screen, it interacts with a phosphor coating (D) on the face of the tube to generate a spot of visible light.

To produce a screen image, the electron beam sweeps from left to right and from top to bottom in a series of raster lines (E). The movement of the electron beam is controlled by deflection coils (F) wound like a yoke around the neck of the CRT; electric current flowing through the coils produces magnetic fields that control the electron beam. Increasing current in the horizontal-deflection coil forces the beam from left to

right; a drop in current causes the beam to return to the left. Meanwhile, an increase in the vertical-deflection coil's current aims the beam down a line. This pulsing action results in a sawtooth waveform (G).

The horizontal-scan frequency for a typical computer monitor is generally between 10kHz and 30kHz, which falls in the very-low-frequency (VLF) range. Because most monitors operate at 60 to 75 frames per second, their vertical-scan frequency is between 60Hz and 75Hz, within the extremely-low-frequency (ELF) range. Both electric and magnetic fields are generated in the ELF and VLF ranges.

In addition, 60Hz alternating-current (AC) fields originate in the monitor's power transformer. (60Hz AC current flows back and forth 60 times a second.) Since the AC fields decay rapidly over distance, they can usually be measured only in the immediate vicinity of the power transformer.—P.B.





## SOMEONE SHOULD REMIND THE MONITOR MANUFACTURERS THAT SCIENTISTS DON'T KNOW EXACTLY HOW INHALED ASBESTOS FIBERS ACT TO CAUSE CANCER, AND ONLY FOOLS WOULD WILLINGLY EXPOSE THEMSELVES TO ASBESTOS

current, distribution wires carrying high current produce relatively strong magnetic fields—invisible lines of force that readily penetrate almost anything that happens to stand in their way, including the human body.)

In their article, Wertheimer and Leeper pointed out that magnetic fields in homes near high-current wires might reach levels of 2 milligauss or more “for hours or days at a time,” and that if magnetic-field exposure were responsible for the increased incidence of childhood cancer they had observed, the duration of exposure might be an important factor. They also suggested that the magnetic fields from power lines might be promoting cancer in children by hindering the ability of the body’s immune system to fight the disease.

Instead of taking Wertheimer and Leeper’s disturbing findings as a sign that the magnetic-field problem should be thoroughly investigated, the electric-utilities industry tried to discredit their work. But in 1986 the association between magnetic fields from high-current wires and childhood cancer was confirmed by a major study conducted under the auspices of the New York State Department of Health. This investigation reported that “prolonged exposure to low-level magnetic fields may increase the risk of developing cancer in children.” Earlier, a similar finding was announced by scientists studying childhood cancer in Sweden. What should have been of profound concern to the manufacturers and users of display monitors was that the incidence of cancer in all three childhood studies was associated with 60Hz magnetic-field strengths of only 2 to 3 milligauss.

### Computer Monitors Implicated

The fact that display monitors emit significant radiation in the form of pulsed ELF electric and magnetic fields did not come to light until October of 1982. At that time, Dr. Karel Marha, a biophysicist at the Canadian Centre for Occupational Health and Safety



**DR. KAREL MARHA**

*Manager, physical hazards group, at the Canadian Centre for Occupational Health and Safety*

(CCOHS) in Hamilton, Ontario, revealed that Canadian researchers had measured 60Hz magnetic fields greater than 2 milligauss at distances of 12 inches from two display monitors, and fields of approximately 1 milligauss at a distance of 20 inches from several screens. In 1983, CCOHS issued press releases carrying Marha’s warning that there was scientific evidence to suggest that pulsed electric and magnetic fields could be more harmful than nonpulsed fields, as well as his recommendation that workplaces be redesigned so that VDT operators do not sit close to their display monitors or

to neighboring monitors.

Marha’s recommendations were ignored by government health officials in Canada and the United States, who failed to appreciate the possible connection between the potential health hazard of alternating-current 60Hz power-line magnetic fields and that of the pulsed 60Hz magnetic fields given off by display monitors. Moreover, the CCOHS press releases were not picked up by any major newspaper in the United States or Canada. A year later, the medical director of the *New York Times* told a congressional subcommittee that he was aware of “no medical evidence of serious VDT-related health effects.” By then, of course, newspapers everywhere had become highly dependent upon computer technology.

### Supporting Evidence

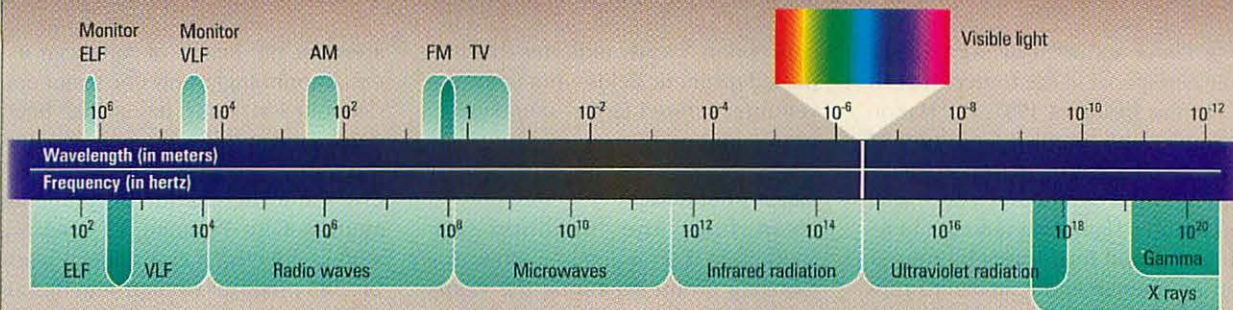
In July of 1982, shortly before Marha’s announcement that display monitors were emitting potentially hazardous electric and magnetic fields, Dr. Samuel Milham, Jr., a physician and epidemiologist for the Washington State Department of Social and Health Services, published a letter in the *New England Journal of Medicine* that furnished a new insight into the problem. Milham had examined the data for 438,000 deaths occurring between 1950 and 1979 among workers in Washington State and had found that leukemia deaths

were elevated in 10 out of 11 occupations involving exposure to electromagnetic fields. His pioneering study provided the starting point for some 20 subsequent investigations here and abroad, which showed that persons whose occupations require them to work in electromagnetic fields—among them electricians, electrical engineers, and telephone- and power-line workers—die of leukemia and brain cancer at a much higher rate than other workers.

For example, a 1984 study demonstrated that a significantly higher than expected number of Maryland



# ELECTROMAGNETIC SPECTRUM



While all electromagnetic radiation, from the longest radio wave to the shortest gamma ray, travels at 186,000 miles per second—the speed of light—visible light makes up only a small portion of the spectrum. As the wavelength (shown in meters) increases, the frequency (shown in hertz, or cycles per second) decreases. Display monitors give off several types of electromagnetic emissions; most of the emissions consist of pulsed radio-frequency (VLF) electric and magnetic fields of between 15 and 20kHz and pulsed ELF electric and magnetic fields of 60Hz. The ELF magnetic field is the dominant waveform given off by VDTs.—P.B.

men who had died from brain cancer had been employed in electrical occupations, and a 1988 study of men who had died of brain cancer in East Texas revealed that the risk for electric-utility workers was 13 times greater than that for workers who were not exposed to electromagnetic fields.

Additional cause for concern came in November of 1989 with the announcement that a study conducted by epidemiologists at the Johns Hopkins University School of Hygiene and Public Health, in Baltimore, had found an elevated risk of all cancers among cable splicers working for the New York Telephone Company. Indeed, the incidence of leukemia among these men, who often work close to power lines, was 7 times that of other workers in the company. Moreover, measurements of their on-the-job exposure showed that the mean level of the 60Hz alternating-current magnetic-field strengths to which they had been subjected was only 4.3 milligauss. Considering the fact that a pulsed ELF magnetic field level of between 4 and 5 milligauss has been measured at a distance of 12 inches from the Apple 13-inch color monitor and from E-Machines' Color-Page 15, this is a discomfiting finding, to say the least.

## Laboratory Studies Concur

While epidemiologists were investigating the incidence of cancer among human beings exposed to low-level electromagnetic fields, other scientists were studying the effect of weak ELF fields on test animals. Chief among

them was Dr. W. Ross Adey, a clinical neurologist and neuroscientist, who was formerly the director of the Brain Research Institute at the University of California at Los Angeles and is now associate chief of staff for research at the Jerry L. Pettis Memorial Veterans' Hospital, in Loma Linda, California. During the 1970s, Adey and his colleagues discovered that weak ELF electromagnetic fields altered brain chemistry in living cats. During the 1980s they found that low-level electromagnetic fields can interfere with the ability of T-lymphocyte cells—the soldiers of the immune system—to kill cancer cells, which suggests that these fields may be acting as cancer promoters by suppressing the immune system.

In 1988, Adey and his associates demonstrated that weak 60Hz electric fields similar in strength to those that can be found in the tissue of a human being standing beneath a typical overhead high-voltage power line (or, for that matter, in the tissue of someone standing very close to a display monitor) could increase the activity of an enzyme called ornithine decarboxylase, which is associated with cancer promotion.

Back in 1980 and 1981, even as government health officials in the United States and Canada were denying any possible connection between electromagnetic emissions from display monitors and adverse pregnancy outcomes among women who worked with those machines, Spanish researchers were conducting experiments showing that when chicken eggs were exposed to weak pulsed ELF

magnetic fields, nearly 80 percent of them developed abnormally, with malformations of the cephalic nervous system being particularly prevalent. The adverse effect of pulsed magnetic fields upon the development of chick embryos was confirmed in 1984 by scientists at the Swedish National Board of Occupational Safety and Health.

Later that year, however, Professor Arthur W. Guy, director of the Bioelectromagnetic Research Laboratory at the University of Washington, in Seattle, who had been hired by IBM to review the literature on the biological effects of VDT emissions, pointed out that the weak magnetic-field pulses used by the Spanish researchers did not match the sawtooth shape of the pulses emitted by computer display monitors, and concluded that there was no valid evidence that monitor emissions posed any health hazard.

## Further Indications

Early in 1986, Guy's criticism was addressed in a Swedish study conducted by Dr. Bernhard Tribukait, a professor of radiobiology in the Department of Radiobiology of the world-renowned Karolinska Institute, in Stockholm. Together with a colleague, Tribukait discovered that the fetuses of mice exposed to weak pulsed fields with the same sawtooth shape as those given off by display monitors experienced more congenital malformations than did the fetuses of unexposed test animals. (This finding was reported by Tom Brokaw on "NBC Nightly News," but went unmentioned by the *New*



York Times and virtually every major daily newspaper in the United States.)

In the spring of 1987, Dr. Hakon Frölen, of the Swedish University of Agricultural Sciences, in Uppsala, Sweden, reported that he and a colleague had found a significant increase in fetal deaths and fetal losses by resorption (a phenomenon similar to miscarriage in humans) among pregnant mice exposed to weak pulsed magnetic fields, compared with those occurring in nonexposed test animals. In June, other Swedish scientists reported that radiation similar to that emitted by display monitors could cause genetic effects in exposed tissue samples. An important aspect of all three Swedish studies was that the radiation exposure in each of them had been designed to mimic as closely as possible the sawtooth magnetic-field pulses emitted by VDTs.

Further evidence that weak pulsed magnetic fields might be hazardous to health came in the spring of 1988, when the combined results of a six-laboratory experiment conducted in the United States, Canada, Spain, and Sweden confirmed the earlier finding that such fields could indeed adversely affect the development of chick embryos. Later that year, Frölen found that the fetuses of pregnant mice were most sensitive to pulsed magnetic fields in the early stages of pregnancy, which was consistent with a similar observation by Canadian and Spanish researchers.

At the second international VDT conference, which was held in Montreal in September of 1989, Frölen described a series of experiments in which he delayed exposing pregnant mice to pulsed magnetic fields for up to nine days after conception. The results were striking. All of the mice that were exposed immediately after conception, or on the first, second, or fifth day after conception, had statistically increased rates of resorption.

Louis Slesin, the editor and publisher of *VDT News*—a newsletter that reports six times a year on the biological effects of display monitors (see *Conspicuous Consumer*, in this issue, for contact information)—has emphasized the importance of Frölen's findings, pointing out that the lack of any effect after the ninth day following

conception "clearly indicates that the pulsed magnetic fields—not some as-yet-unrecognized factor—are damaging the embryos."

### Industry Responses

Meanwhile, the Coalition for Workplace Technology—a powerful lobbying group set up by the Computer and Business Equipment Manufacturers Association (CBEMA) and strongly supported by IBM—had been lobbying since 1984 in various state legislatures against laws designed to protect the health of VDT workers. Computer manufacturers continued to scoff at the idea that their devices might emit hazardous radiation. One industry spokesperson, Charlotte Le Gates, the director of communication for CBEMA, declared that for pregnant operators to ask to be transferred away from VDTs "is like asking to be transferred away from a light bulb."

By using this simile repeatedly, computer manufacturers and their paid consultants in CBEMA and the Center for Office Technology have been unquestionably successful in allaying growing concern among computer users that the emissions from display monitors might be hazardous. The comparison is specious and unscientific, however. A light bulb emits no magnetic field whatsoever—a fact that can easily be ascertained by holding a gauss meter (a device that measures the strength of a magnetic field) to an incandescent light bulb. As the accompanying measurements taken by *Macworld* clearly show (see "Macworld Tests"), however, many display monitors *do* emit magnetic fields that are as strong or even stronger than the magnetic-field levels that have been associated with the development of cancer in children and workers.

### Risk Acknowledged

The accumulation of evidence suggesting that the electromagnetic fields given off by display monitors may be hazardous, together with the fact that there are now some 40 million computer terminals in the workplace, raises the question of why so few epidemiological studies have been conducted in the United States to determine whether monitor emissions are

affecting the health of American users. Astonishingly, only one major epidemiological study has so far been conducted in this country. It was performed by researchers at the Northern California Kaiser Permanente Medical Care Program, in Oakland, who conducted a case-control study of 1583 pregnant women who had attended Kaiser Permanente obstetrics and gynecology clinics during 1981 and 1982.

In an article entitled "The Risk of Miscarriage and Birth Defects among Women Who Use Visual Display Terminals During Pregnancy" (*American Journal of Industrial Medicine*, June 1988), Kaiser researchers wrote that they had found that women who worked with VDTs for more than 20 hours a week experienced a risk of both early and late miscarriage that was 80 percent higher than the risk for women who performed similar work without using VDTs. In their conclusion, the researchers stated, "Our case-control study provides the first epidemiological evidence based on substantial numbers of pregnant VDT operators to suggest that high usage of VDTs may increase the risk of miscarriage."

### Apple Responds

As might be expected, the results of the Kaiser Permanente study, together with the Swedish experiments demonstrating that the emissions from display monitors can adversely affect the fetuses of test animals, have prompted many computer users to write to computer manufacturers to ask whether their monitors are safe to use. One such letter was sent on November 5, 1989, to John Sculley, chief executive officer of Apple Computer, by Professor Harris Barron, who taught electronic media in art-making at the Massachusetts College of Art in Boston for 25 years. In his letter, Barron told Sculley that he was writing on a Macintosh SE; that his young daughter-in-law, "an avid law school scholar, sits long hours at the terminal of her own SE"; and that "she and her computer-user husband intend to raise a family in the near future." (As the reader will note in "Macworld Tests," *Macworld* has measured an ELF magnetic field of slightly more than 2 milli-



# MACWORLD TESTS

To determine the strength of the ELF magnetic fields emitted by monitors regularly used with Macintosh computers, *Macworld* tested ten monitors in our labs. Using the Holaday HI-3600-02 ELF/Power Frequency EMF Survey Meter, we measured emissions at 4, 12, 28 (arm's length), and 36 inches from the center of the front, back, left, right, top, and bottom of the monitors. (For logistic reasons, we could not complete all the measurements from the bottom.) While it is important to note that magnetic-field strengths may vary somewhat from monitor to monitor, even within a single product line, the overall test results do

confirm that ELF magnetic-field emissions from monitors used with the Macintosh are worrisome.

The strongest emissions are at the sides and tops of the monitors—over 70 milligauss (mG) 4 inches from the right side of the AppleColor High-Resolution RGB Monitor, for instance. At the same distance from the front, emissions are over 22mG for the Apple monitor and the E-Machines ColorPage 15. As detailed in the main article, levels much lower than these have been correlated with cell mutation and cancer in humans. At 28 inches (arm's length), however, the emissions from the front fall to below 1mG.

## EMISSION RANGES



### LEFT

	4"	12"	28"	36"
1	67.75	13.86	2.09	1.11
2	17.45	3.40	0.59	0.32
3	11.58	2.68	0.43	0.23
4	12.59	2.59	0.41	0.25
5	30.50	7.63	1.14	0.62
6	13.00	3.05	0.49	0.27
7	55.13	12.96	2.03	1.14
8	33.25	4.95	0.63	0.36
9	26.88	4.48	0.58	0.28
10	28.50	4.90	0.60	0.30

### TOP

	4"	12"	28"	36"
1	62.38	9.65	1.18	0.68
2	13.40	2.45	3.78	0.24
3	10.58	1.79	0.30	0.18
4	10.76	1.73	0.35	0.18
5	30.50	5.44	0.87	0.48
6	9.70	1.91	0.34	0.20
7	73.50	11.59	1.62	0.91
8	24.28	3.06	0.45	0.26
9	24.10	2.91	0.44	0.39
10	27.00	3.18	0.42	0.27

### BACK

	4"	12"	28"	36"
1	37.63	6.40	1.09	0.61
2	8.96	1.68	0.30	0.20
3	4.44	0.85	0.20	0.14
4	3.56	0.89	0.21	0.14
5	19.11	4.03	0.62	0.37
6	4.86	1.23	0.26	0.17
7	44.25	7.78	1.23	0.64
8	21.85	2.60	0.40	0.21
9	19.93	2.48	0.31	0.18
10	21.45	2.59	0.40	0.17

### FRONT

	4"	12"	28"	36"
1	22.73	4.93	0.96	0.64
2	7.73	1.61	0.33	0.30
3	4.85	1.11	0.38	0.29
4	4.79	1.24	0.29	0.25
5	22.13	4.10	0.67	0.54
6	4.93	1.46	0.31	0.03
7	13.53	4.04	0.98	0.54
8	15.91	1.99	0.36	0.30
9	15.05	2.18	0.37	0.33
10	15.06	2.16	0.36	0.32

### BOTTOM

	4"	12"	28"
1	12.35	1.53	0.82
2	2.22	0.43	0.25
3	1.47	0.28	0.19
4	1.45	0.28	0.18
5	6.60	1.10	0.55
6	1.79	0.34	0.20
7	9.49	1.36	0.85
8	1.16	0.27	
9	1.34	0.27	
10	1.66	0.25	

### RIGHT

	4"	12"	28"	36"
1	70.88	15.38	2.24	1.12
2	10.18	2.70	0.50	0.28
3	7.75	2.20	0.38	0.22
4	7.51	2.09	0.38	0.23
5	29.88	7.18	1.16	0.66
6	13.10	2.98	0.47	0.30
7	54.88	13.65	2.26	1.21
8	28.25	5.21	0.62	0.31
9	27.38	3.75	0.56	0.36
10	31.50	4.16	0.62	0.32

- AppleColor High-Resolution RGB Monitor
- E-Machines ColorPage T16 Display System
- MegaGraphics MegaScreen 2008/19
- Radius Color Display
- E-Machines ColorPage 15

- Generation X Technologies CT-II
- SuperMac 19" Color Display
- Macintosh Plus
- Macintosh SE
- Macintosh SE/30





## ONE DOES NOT NEED TO BE A MEDICAL DOCTOR TO APPRECIATE THAT SUCH ELECTROMAGNETIC PHENOMENA, WHICH HAVE NO COUNTERPART IN MAN'S EVOLUTIONARY HISTORY, MAY WELL PROVE HAZARDOUS TO HEALTH

gauss at a distance of 12 inches from the screen of the SE display monitor.) Barron then asked whether his daughter-in-law was at risk from the electromagnetic fields emitted by her monitor and told Sculley that "the results of any studies that Apple has made in this regard would be helpful."

On December 6, 1989, Barron received an unsigned letter from the Apple Customer Relations Department, thanking him for his letter and informing him that some materials were enclosed for his perusal. The enclosed material consisted of an article from the February 1984 issue of *Health Physics*, which said that X-ray emissions from VDTs posed no health problem; some 1984 recommendations by the European Computer Manufacturers Association on how to avoid ergonomic problems from VDT use; a 1983 policy statement issued by the American Academy of Ophthalmology, which said that VDTs presented no hazard to vision; and some 1985 Apple safety data sheets about the testing of toner materials.

On December 11, 1989, Barron wrote Sculley to express disappointment with Apple's response to his initial query. "With your pro forma mailing, I am now armed with 1984 materials, data so antiquated that I would be embarrassed to use it, as would Apple in any of its public relations," Barron said. "Reprints of ergonomic factors, ocular data, toner safety data, and the 'put-to-bed' X-ray issue totally ignored my one basic question on permanent harm from ELF magnetic-field VDT emissions." In conclusion, Barron told Sculley that he intended to prepare a statement about his correspondence with Apple for circulation to his contacts in higher education, including the National Education Association.

### Further Equivocations

On January 9, 1990, Barron received a reply to his second letter from David

C. McGraw, Apple's newly appointed manager for corporate environmental health and safety. McGraw apologized for the delay and confusion in getting back to Barron, and assured him that "the pro forma response to your initial letter dated 11/5/89 is not the way Apple wishes to respond to this important issue." He went on to tell Barron that "Apple believes that no increased risk of adverse pregnancy outcome due to VDT work has been demonstrated," and to point out that Apple's position in this regard "is supported by the American Medical Association, the American College of Obstetricians and Gynecologists, the National Institute for Occupational Safety and Health (NIOSH), and the World Health Organization (WHO)."

McGraw said that the Kaiser Permanente study "drew public attention because of what appeared to be an increase in miscarriages among women who use VDTs more than 20 hours per week," but that the researchers who conducted it "were unable to determine the specific cause of the increased rate of miscarriages." He then noted that "similar studies in Canada and Scandinavia have found no relationship between VDT work and adverse pregnancy outcome." McGraw enclosed the results of a recent animal study that had been conducted for IBM and Ontario Hydro by researchers at the University of Toronto, who, unlike Drs. Frölen and Tribukait, had found that pulsed magnetic fields did not adversely affect the fetuses of test mice. He also recommended that Barron read a compendium entitled *Latest Studies on VDTs*, published in August 1989 by the Center for Office Technology. (This is the new name of the Coalition for Workplace Technology of the Computer and Business Equipment Manufacturers Association, which had previously assured computer users that the emissions from a display terminal were no different than those from a light bulb.)

In January of this year, McGraw sent Barron the names and résumés of three people whom he described as "experts in the field of biological effects of electromagnetic radiation." One was Edwin L. Carstensen, a professor of electrical engineering at the University of Rochester, who has been a paid consultant of the electric-utility industry for nearly 15 years and has testified for power companies in court cases on several occasions. Another was Kenneth R. Foster, a professor in the Department of Bioengineering at the University of Pennsylvania, who has not only discounted the possibility that low-level electromagnetic radiation can have adverse biological effects but has even suggested that restrictions be placed on further investigation of the problem. The third was Eleanor R. Adair, a physiologist at the John Pierce Foundation, in New Haven, Connecticut, who, in spite of dozens of scientific studies published in leading scientific journals around the world demonstrating that weak pulsed electromagnetic fields given off by display monitors and low-level fields emitted by radar and other sources can cause adverse biological effects at field strengths far below those necessary to produce heat, has recently been quoted as saying that she has "never seen one bit of scientific evidence—and let me emphasize the word *scientific*—that ELF or microwave radiation has any nonthermal biological effects."

### Answering Critics

Macintosh and other computer users must now decide for themselves whether monitor manufacturers are dealing forthrightly with the issue of display monitor emissions. It is clear that computer users are being asked by manufacturers to extend the presumption of benignity to the pulsed electric and magnetic fields given off by display monitors, even as scientists continue to investigate the apparent health hazard posed by these emissions. One of the chief rationales behind this strategy is the belief that there is no "conclusive" proof that VDT emissions have any harmful effects on computer users. Another is that no biological mechanism has yet been postulated to show exactly how pulsed magnetic fields might cause miscar-



## AT ARM'S LENGTH

riages and cancer. In other words, if scientists can't explain how something is happening, it can't be happening. Someone should remind the monitor manufacturers that scientists don't know exactly how inhaled asbestos fibers act to cause cancer; yet everyone knows that asbestos causes cancer, and only fools would willingly expose themselves to asbestos.

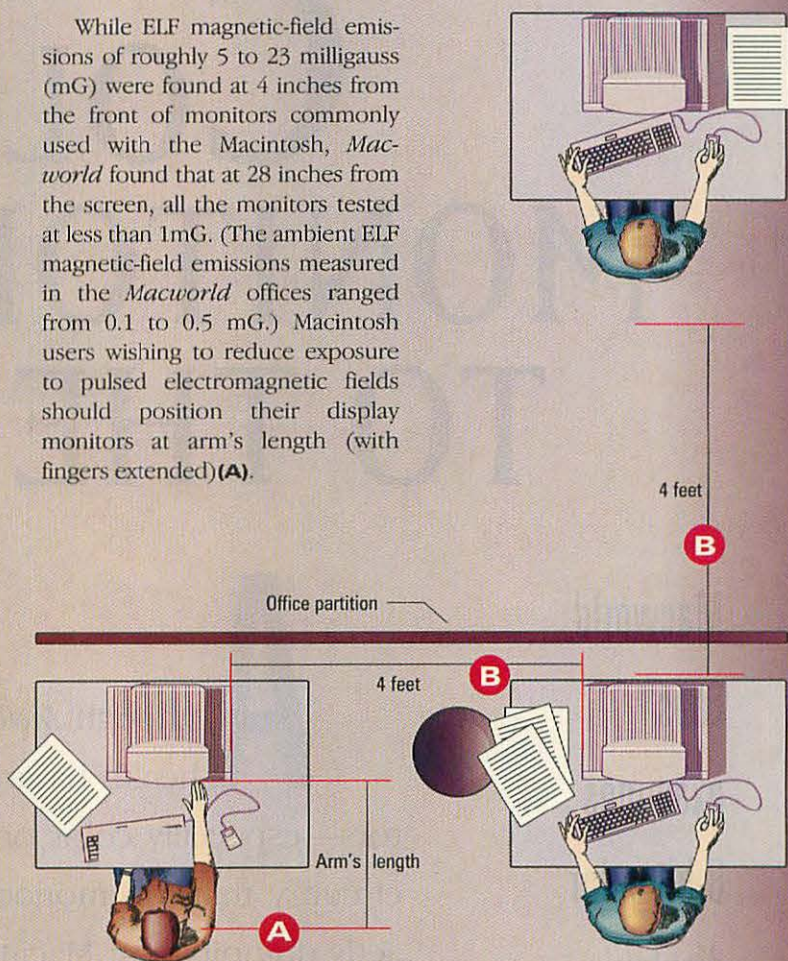
As it happens, a model of how a 60Hz alternating-current magnetic field may cause or promote cancer has been provided by Dr. Harris Busch, an oncologist, who was chairman of the Department of Pharmacology of the Baylor University College of Medicine in Houston for 25 years and was also formerly an editor of the distinguished *American Journal of Cancer Research*. After explaining that a 60Hz alternating-current magnetic field vibrates to and fro 60 times a second, Busch points out that there will be a similar to-and-fro movement on the part of anything magnetic in such a field. According to Busch, this means that "any kind of molecule that is in a person's brain, or in a person's body, is being twisted 60 times a second up and back."

Recently, Dr. W. Ross Adey has made the point that in the case of weak electromagnetic fields given off by display monitors, the tissue responses can take account of the regularity of the repeating pulses and assume the rhythm of those pulses in a phenomenon called *entrainment*, which, in turn, can alter the normal activation of enzymes and cellular immune responses in ways consistent with the promotion of cancer.

One does not need to be a medical doctor to appreciate that such electromagnetic phenomena, which have no counterpart in man's evolutionary history, may well prove hazardous to health. ■

**Paul Brodeur**, a staff writer at the *New Yorker* since 1958, specializes in medical and science writing. The winner of many national awards for his reporting on the dangers of asbestos, the hazards of enzymes in household detergents, the destruction of the ozone layer, and the effects of electromagnetic emissions, Brodeur's most recent book is *Currents of Death* (Simon and Schuster, 1989).

While ELF magnetic-field emissions of roughly 5 to 23 milligauss (mG) were found at 4 inches from the front of monitors commonly used with the Macintosh, *Macworld* found that at 28 inches from the screen, all the monitors tested at less than 1mG. (The ambient ELF magnetic-field emissions measured in the *Macworld* offices ranged from 0.1 to 0.5 mG.) Macintosh users wishing to reduce exposure to pulsed electromagnetic fields should position their display monitors at arm's length (with fingers extended) (A).



Because magnetic fields emitted from the sides and backs of most monitors are considerably stronger than those given off from the front, users should consider maintaining a distance of at least 4 feet from the sides or back of any other monitor in the workplace (B). Keep in mind that magnetic-field emissions are not stopped by cubicle partitions, walls, lead aprons, or even the human body.

Curiously, there are no standards for ELF magnetic-field emissions, although several countries, Sweden and Canada among them, have developed standards for VLF magnetic-field emissions. A number of vendors—IBM, DEC, and Philips, for instance—market monitors for PCs that meet those standards. For the past two years, Sigma Designs has supplied the European market with monitors for the Mac that meet the VLF standards, and American users can now special order these monochrome and gray-scale 15-, 19-, and 21-inch monitors. Also, any monitor based on a technology other than a cathode-ray tube will have the advantage of not emitting the types of pulsed radiation associated with vertical- and horizontal-deflection coils. For a discussion of various products that claim to mitigate monitor emissions, see *Conspicuous Consumer* in this issue.

The controversy surrounding low-frequency electromagnetic emissions will continue until further research is completed. In the meantime, prudent avoidance—sitting at arm's length from the front and 4 feet from the sides or back of a monitor—is a sensible solution. *Macworld* is committed to documenting any new developments as they relate to this issue. Stay tuned.—Suzanne Stefanac





SPECIAL REPORT

# COLOR MONITORS PUT TO THE TEST

Macworld  
Labs  
examines  
8-bit color  
display  
systems

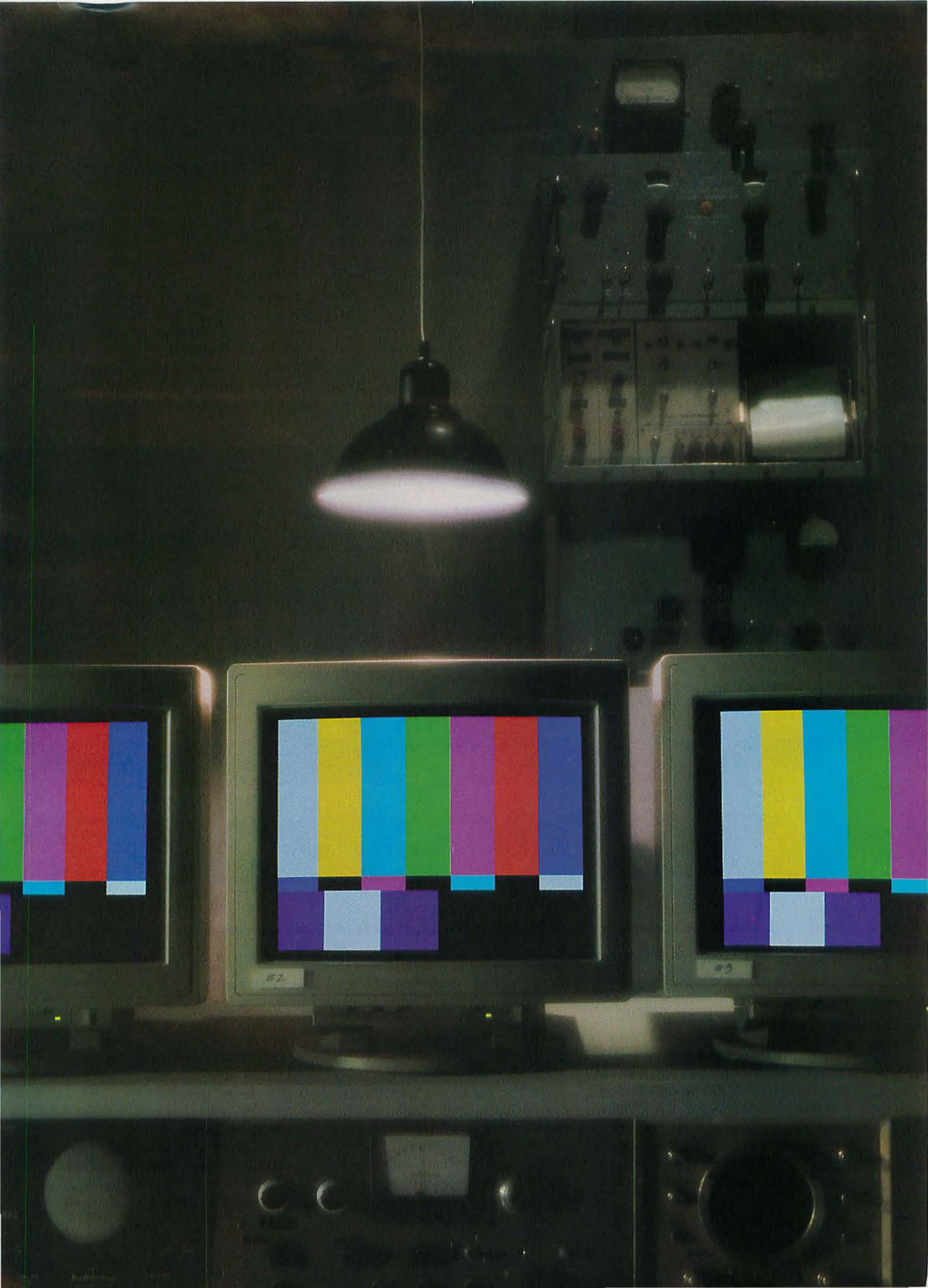
BY ROBERT ECKHARDT

**A**lthough *Macworld* believes there may be a health hazard involved with the use of monitors—especially color ones, which have more electronic circuitry than do monochrome monitors—we aren't exactly dumping our Macintosh II displays in the garbage. A number of us have, however, pushed the monitors farther back on our desks or added keyboard extenders to our work space. As long as you take similar precautions, we see no reason to avoid adding a color monitor to your Macintosh setup. A large color monitor may even be a necessity for some applications. Do, however, pay careful attention to the monitor dimensions listed in "Color Monitors Compared." These will tell you how well a certain monitor fits into your work area.

For this annual review of color displays, we tested seventeen 8-bit color systems—matched monitors and boards from the same manufacturer—for the Macintosh II. Macworld Labs tested each system for about a dozen objec-

PHOTOGRAPHS BY PIERRE-YVES COATEC







tive criteria (see "Color Monitor Lab Tests"), and a handpicked panel of critics from *Macworld's* art and editorial departments ran the monitors through a battery of subjective tests. And, last but not least, I spent several days sitting across from 17 colorful monitors, searching for the Macintosh Holy Grail, the ideal color monitor.

Overall, testers and critics alike were impressed by the high quality of this year's collection of color systems. In fact, more than a few people involved in the testing found it difficult to pick just one or two favorites. Unlike in roundups of previous years, very

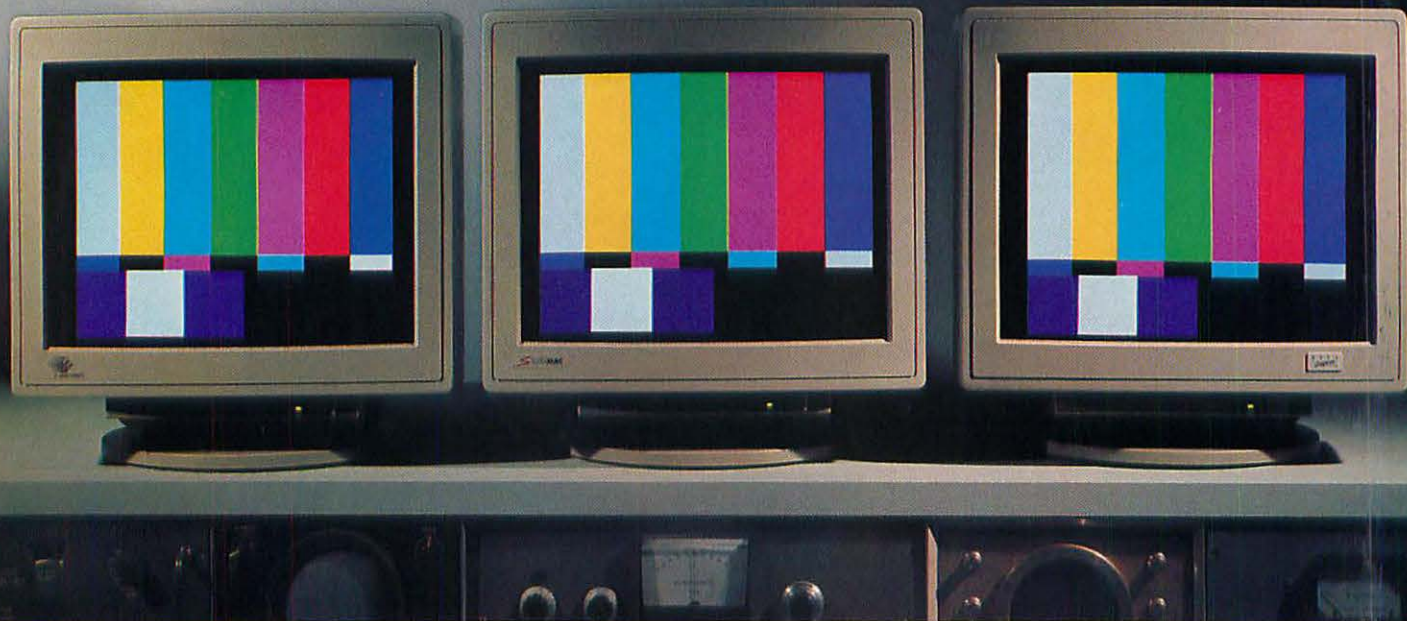
### The Ultimate Test: A Color Image

The ultimate test of any color system, naturally enough, is how well it displays color images. Using several test images, the panel of critics rated the systems according to a subjective impression of overall image quality. The three 16-inch systems were common favorites, with the E-Machines TX taking top honors with comments such as "excellent saturation," "vivid colors," and "good contrast."

Among the other displays there was a wider variety of opinions (indicative of the generally high quality of the choices), but most everyone

the PCPC II/21, and the Relax/Ikegami Trinitron Display System (which some also criticized, along with the PCPC II/21, as being "too green").

But many factors contribute to how well a monitor displays a color image. When those factors are viewed individually, differences in the monitors become more striking. Sometimes those differences can even make a monitor that looked weak at first glance, look strong for particular applications. For instance, just because a monitor's focus is ideally suited for viewing fine-lined CAD drawings doesn't mean that it can display a red



**A**lthough all color monitors are gaining in quality, we found some favorites. MegaGraphics' MegaScreen 2008/19, SuperMac's 19" Trinitron Color Display, and E-Machines' T19 fared well in our objective and subjective tests. We'd recommend any of these monitors to users looking for a large screen.

few monitors had major problems. One other thing that distinguishes this year's crop of monitors from those of previous years is the group of three 16-inch monitors—the E-Machines ColorPage T16 and TX and the MegaGraphics MegaScreen 2008/16—which pretty much swept the field in both objective and subjective tests. But I'm getting ahead of myself.

gave high marks to the MegaGraphics MegaScreen 2008/19, the RasterOps ColorBoard 708+ System, the E-Machines T19, the Radius Color Display, and the SuperMac 19" Trinitron Color Display. The lowest-rated monitors (which our critics often described as "washed out" or "dull") were the E-Machines ColorPage 15, the CalComp ChromaVision 2-Page Display System,

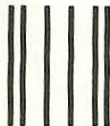
poppy brilliantly. To get a better idea of where color systems succeed or fail, let's look more carefully at the parts that make the whole.

### Covering the Territory

When buying a color monitor, you should pay careful attention to the amount of terrain it can display. The diagonal size of the tube and size of



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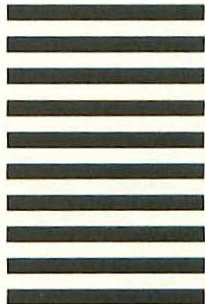
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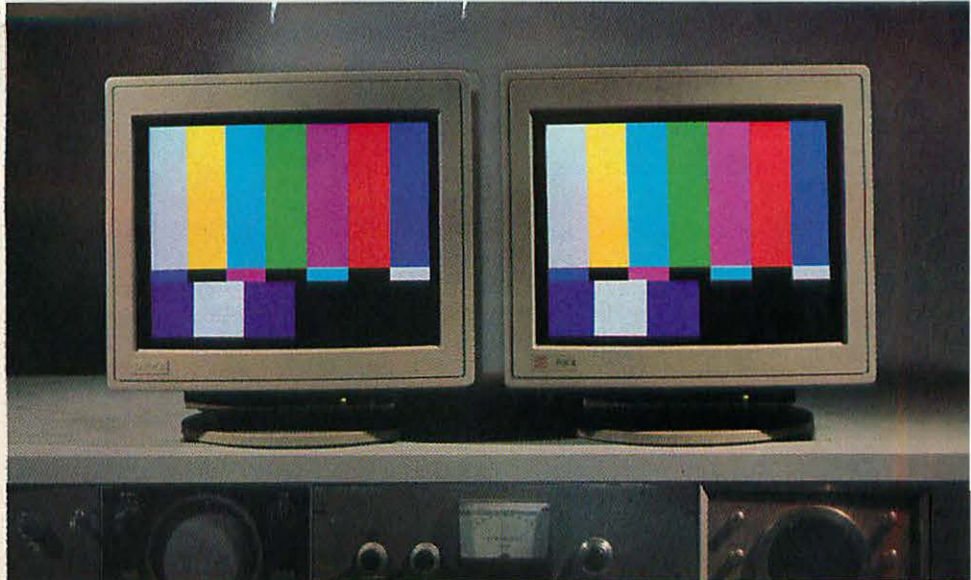


the active area (the portion of the screen used to display information) give only a rough idea of the maximum document size you can see without scrolling. To quickly determine how large a document can be viewed on the screen, divide the resolution by the Macintosh's standard of 72 pixels per printed inch.

On the low end is Apple's 13-inch High-Resolution RGB Monitor, whose 640 by 480 resolution can't even display one full page. The resolution of 16-inch displays ranges from the ColorPage T16's 832 by 624 (approximately equal to a horizontal 8.5-by-11-inch page) to the E-Machines TX's 1024 by 808 (about 13.8 by 10.3 inches of displayed page area). The 19-inch and 21-inch monitors can, of course, display the largest page areas. The 21-inch CalComp ChromaVision and the 19-inch Radius Color Display are almost large enough to display two facing 8.5-by-11-inch pages. For a comparison of maximum displayed image size using Excel spreadsheet cells, see "Color Monitors Compared."

But resolution is only half the story. The other half is pixel density, which is usually measured in dots per inch in monochrome monitors, but is better called pixels per inch (ppi) in color displays. That's because in color monitors three electron guns—one each for red, green, and blue—shoot beams of color onto the monitor's screen. Each beam produces a dot, and these three dots create a pixel. (see "Cathode-Ray Tubes Explained" in "The Magnetic-Field Menace," this issue). Some color monitors break with the traditional 72 ppi and have higher densities, thereby allowing screens with the same physical dimensions to display different maximum page areas. For example, the three 16-inch monitors each have different pixel densities: 72 ppi in the ColorPage T16; 75 ppi in MegaGraphics' MegaScreen 2008/16; and 87 ppi in the E-Machines TX (which explains why the TX can display such a large page area). Most 19-inch and 21-inch monitors have a pixel density of 72 ppi or 75 ppi, but the Radius Color Display sports 82 ppi.

These higher pixel densities make text and graphics look sharper, and also allow designers and page-layout professionals to see two full pages at



**R**asterOps' ColorBoard 708+ and the PCPC II/19 received high marks. Several of our critics saw flicker in the PCPC II/19; PCPC, however, plans to increase the monitor's refresh rate to eliminate the problem.

once. Many consider this ability to be more crucial than having a one-to-one correspondence between on-screen images and printed documents—something you get only with monitors that offer 72 ppi. But a few of our critics felt that pixel densities such as the 87 ppi of the E-Machines TX or the 82 ppi of the Radius Color Display were too high for everyday text-editing. Consider pixel densities above 80 ppi only if you need to view reduced (though proportionally correct) versions of your documents.

#### Brightness and Contrast

Most people prefer a bright monitor—the colors appear vivid and the monitors are often judged to be easier on the eyes. Another reason for buying a bright monitor is that all displays decrease in brightness as the phosphor ages. If a monitor is barely bright enough when you buy it, chances are it won't be bright enough a few years from now. On the other hand, if the monitor is brighter than you need now, you'll be able to adjust the brightness upward in coming years and thus prolong the monitor's useful life. Interestingly, the brightest monitors all have brightness controls; most of the less bright displays, however, have a fixed brightness that can be changed only by adjusting the contrast control.

In our tests, color monitors varied widely in brightness. The brightest displays were the three 16-inch monitors, the Generation X CT-II and Relax

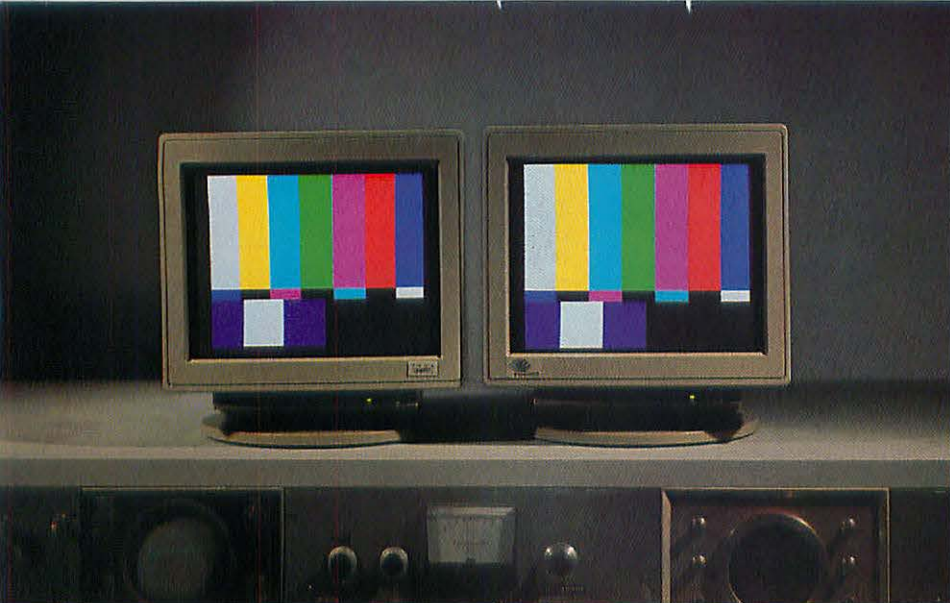
systems (both of which use Ikegami monitors), and the SuperMac 19" Color Display and PCPC II/21 (both of which use Hitachi picture tubes). E-Machines' ColorPage 15 was far brighter than any of these, but its maximum usable brightness level (above which the image went out of focus) was relatively low.

Good contrast works with brightness by preventing that washed-out look, producing whiter whites, blacker blacks, and more vibrant colors. In Macworld Labs contrast tests, the three 16-inch displays disappointed. Front-runners for contrast were, instead, E-Machines' ColorPage 15 and T19, the PCPC II/19, the MegaScreen 2008/19, the Radius Color Display, the SuperMac 19" Trinitron Color Display, and the Sigma Designs ColorMax 8/24 Display System. All monitors have a hardware contrast control, but E-Machines displays also include a software control that performs the same functions. The interaction (some might say the conflict) between the two controls can be confusing.

#### The Color of the Screen

In a color monitor, a number of parameters affect the color, or tint, of the display. Ideally, a blank, white screen should look uniformly white, and gray-scale images should be free of tints. In reality, however, color temperature, tracking and purity problems, and other factors can add color where it's not wanted.





**T**his group of 16-inch monitors were overall favorites. E-Machines' TX fared just a tad better than its brother, the ColorPage T16 (not pictured). The MegaGraphics MegaScreen 2008/16 was no slouch either.

In most of the monitors tested, the color temperature (one of many technical specifications established by monitor makers' engineers) lent a slightly blue cast to a white or light gray screen. The two Ikegami-based monitors, the Generation X CT-II and Relax/Ikegami Trinitron Display System systems, displayed a decided green cast that many of our in-house critics found less than appealing.

Purity—the consistency of a given color across the entire screen—also influences overall screen color. For example, on a pure white field, there should be no red, green, or blue blemishes. If there are, and if demagnetizing the display by pressing a degauss button doesn't eliminate them, the display has purity problems that can muddy colors in the problem areas.

Our subjective critics rated the three 16-inch Trinitrons best in purity (with comments like "excellent" and "extremely even"), with the Radius Color Display, the PCPC II/19, and the MegaScreen 2008/19 not far behind. At the other end of the purity spectrum, our critics gave the CalComp ChromaVision the lowest rating overall ("splotchy" was a typical comment). Opinions of the E-Machines ColorPage 15 ("terrible, like a starburst"), the Relax display ("has dirty, greenish areas"), and the PCPC II/21 ("blotchy") were less than favorable as well.

One other screen color issue is tracking—the ability of the display to

maintain a proper color balance as a particular color shades from light to dark. This is most easily evaluated in a sequence of scaled gray values. With proper tracking, red, green, and blue electron guns should reduce their intensity by the same amount with each darker shade of gray. If one gun gets slightly out of step, however, some shades of gray will contain a color tint. Lab tests and in-house critics agreed that none of the tested color monitors had significant tracking problems.

#### When Images Are Gray

An issue related to tracking is gray-scale uniformity, a monitor's ability to display clearly the different gray levels in a gray-scale sequence. Since most color display owners have to deal with gray-scale as well as color images, gray-scale uniformity is of no small importance. Macworld Labs didn't test for this, but our subjective critics didn't shrink from the challenge.

On a simple, 16-level gray-scale test, the CalComp ChromaVision, the Relax display, the RasterOps ColorBoard 708+, the PCPC II/19 and II/21, and the E-Machines TX performed best by clearly separating (for the human eye) all 16 levels of gray. On most of the other monitors, the darkest 1 or 2 gray levels were indistinguishable from black. When confronted with far more subjective tests using gray-scale images, however, our in-house critics preferred the PCPC II/19 ("the best, with

excellent blacks and highlights"), the MegaScreen 2008/19, the ColorBoard 708+, the E-Machines T19, the three 16-inch monitors, and the Apple display. Least liked were the greenish grays of the Generation X CT-II and Relax systems, and the ColorPage 15, whose sepia-toned grays provoked one critic to say its images looked "like an antique photograph."

Another not so black-and-white issue is how well a monitor displays text. The Trinitron-based monitors tend to display sharper text than others; but the text on some Trinitrons (like the Apple monitor) is bolder and blacker—easier to read—than on others. Our critics rated the Apple display, the three 16-inch monitors, and (among the larger displays) the ColorBoard 708+ and MegaScreen 2008/19 as best for text work. The Generation X CT-II (too "fuzzy around each character," said one critic) and the ColorPage 15 ("really blurry") garnered the lowest legibility ratings.

#### Focusing In

Because focus is a result of the interplay of many different factors, the human eye is probably the most sensitive instrument you can use to measure focus. It's often a problem in the corners and along the edges of a monitor, so that's where I looked the hardest. With the exception of the ColorPage 15, which had noticeable focus problems in the corners, the smaller displays were winners again. But a number of the larger displays—the Radius Color Display, the two SuperMac displays, and the MegaScreen 2008/19—also had excellent focus.

Like focus, moiré patterns are caused by a complex of factors. A moiré is a ripple pattern on what should be a uniform color or texture. All the tested color monitors, with the exception of the CalComp ChromaVision, display noticeable moirés in the standard desktop pattern of alternating black pixels and white pixels. You should be concerned only if moiré patterns crop up frequently elsewhere, such as in solid colors or in complex color images. I detected moirés in color areas on only one monitor, the MegaScreen 2008/19.

When convergence is out of whack (when the three electron beams fail



# COLOR MONITOR PURITY

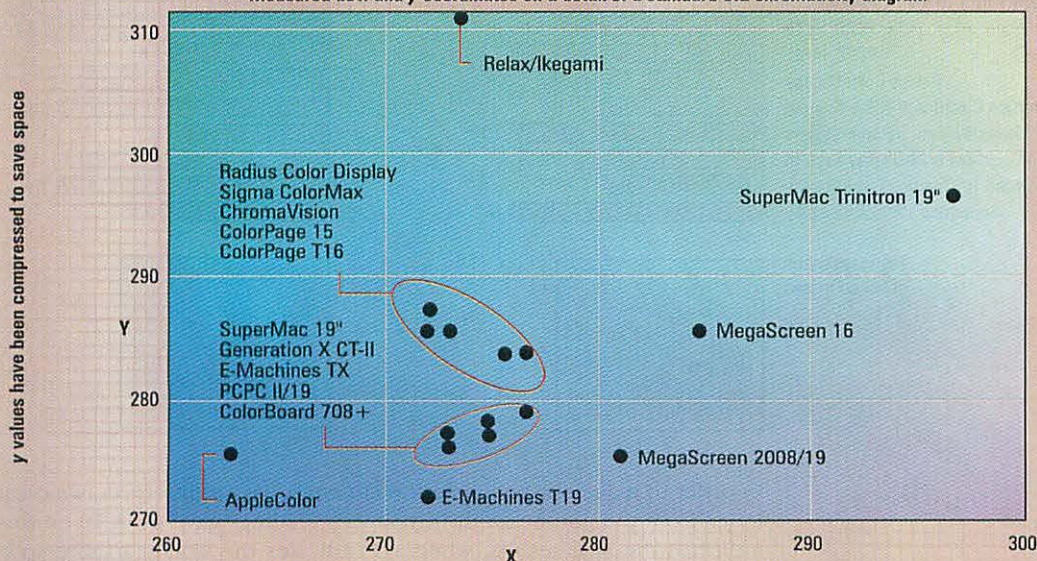
Shown as an indexed deviation from pure white where 0 is pure white



Using a solid white screen, we measured the four corners of each monitor to determine how evenly color is displayed. The best monitors are E-Machines' TX and T16—color is extremely even and these monitors are also quite bright. Of the darker monitors, the Radius Color Display is also quite pure. On the other end, the ChromaVision fared worst. The E-Machines T19 and the Sigma ColorMax have a strange split of colors—the lower-right corner tends toward pink while the upper-left corner is a grayish green.

# PHOSPHOR COLOR

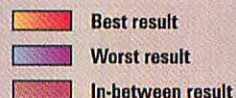
Measured as x and y coordinates on a detail of a standard CIE chromaticity diagram



Each monitor has a distinctive tint due to the color of its phosphor. Most monitors are light blue. The Relax/Ikegami, however, has an aqua color and the SuperMac Trinitron 19" comes closest to white. The test results for the AppleColor came out skewed. The red electron gun for this monitor fires at a higher rate than that of the blue and green guns. So even though the phosphor is blue, the monitor appears pink, like the color in the purity tests above.



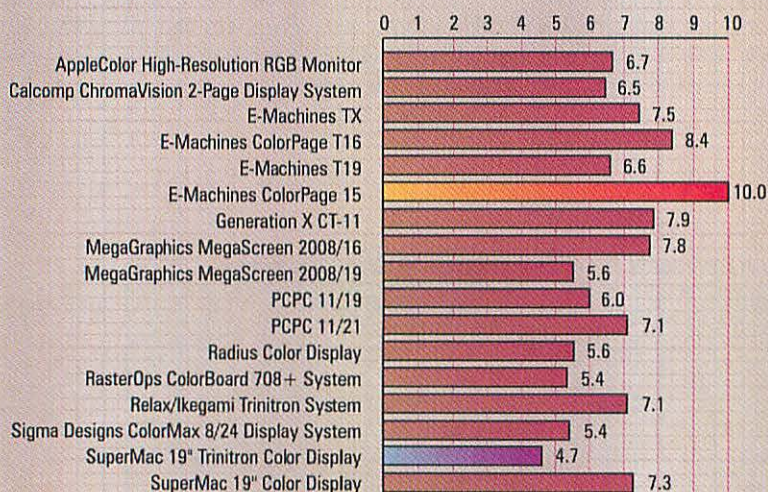
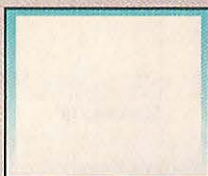
# COLOR MONITOR LAB TESTS



## BRIGHTNESS

Brightness is hard to depict on paper—thus the solid white square denotes a bright monitor while the gray screen denotes a duller one. Most people like very bright screens.

Representation of best in test

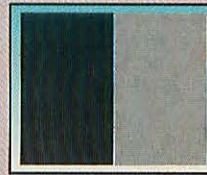
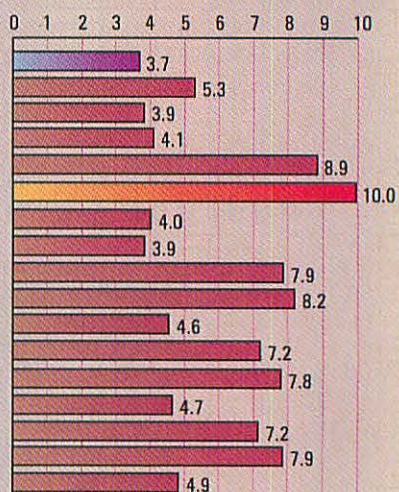
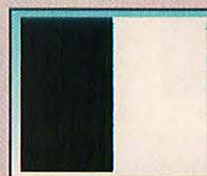


Representation of worst in test



## CONTRAST

Monitors with the best contrast show a clear separation between black and white. Ones that fare worse have a white that leans toward gray and a black that isn't very solid.

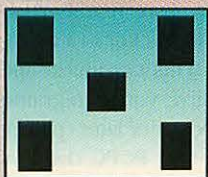
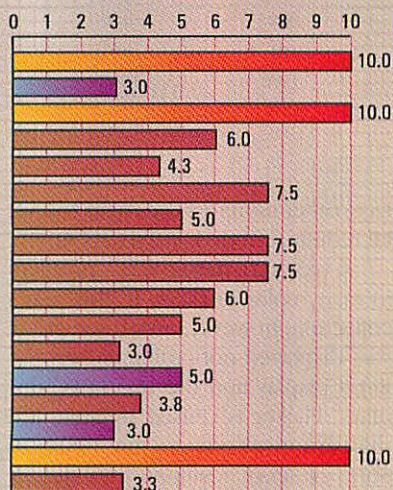
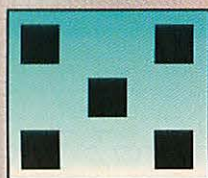


In order to make our benchmark test results easy to interpret, we created an index from the numbers our instrument readings gave us. A 10 on this scale indicates the best results, while a 1 indicates the worst (a score so bad, in fact, that none of the monitors received it). And, so that you know how good is good and how bad is bad, we created graphic representations of the best- and worst-case monitor for each test.



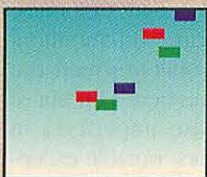
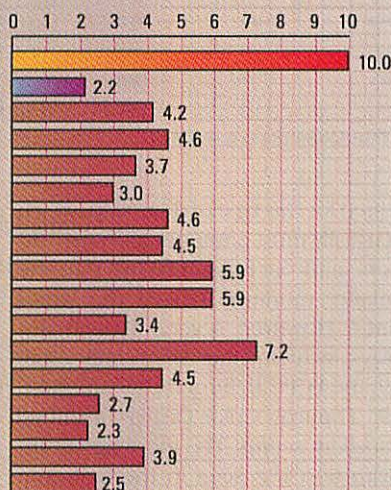
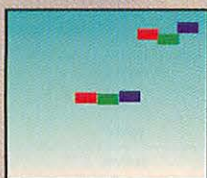
## DISTORTION

We placed perfect squares in each corner of the monitor and measured how distorted they appeared. On a good monitor, squares are square. On a poor one, they have sides of an unequal length.



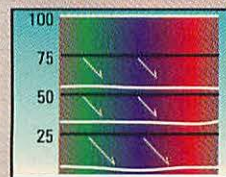
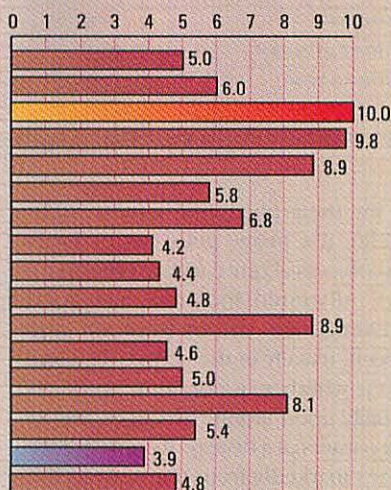
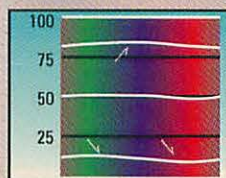
## CONVERGENCE

Convergence denotes how closely the red, green, and blue electron guns are able to hit on the same spot. While no monitor is perfect, those with close alignment offer a more accurate rendering of color.



## TRACKING

As you lower the percentage of white displayed on the screen from 100 to 25, a monitor with good tracking maintains the equilibrium between the three electron guns. A poor monitor has a higher percentage of, say, red at 100% but a higher percentage of, say, blue at 25%.



Don't be too quick to use these numbers alone when making a purchasing decision, however. There are no objective tests for some factors, such as focus. So for instance, while E-Machines' ColorPage 15 scored well on brightness and contrast, we gave it a thumbs down due to poor focus. Also, some factors will weigh more heavily than others. While most people prefer a bright monitor, our subjective tests showed that they will give up some brightness in order to get a monitor with good purity and little distortion.



## COLOR MONITORS COMPARED

	Apple	Calcomp	E-Machines	E-Machines	E-Machines	E-Machines	Generation X	MegaGraphics
Product	AppleColor	ChromaVision 2-Page	ColorPage 15	ColorPage T16	TX	T19	CT-II	MegaScreen
	High-Resolution	Display System						2008/16
	RGB Monitor							
8-bit system retail price	\$1647	\$6395	\$2095	\$3595	\$4495	\$5995	\$6295	\$4698
24-bit system price <sup>1</sup>	\$1898	\$8595	none	none	\$6490	\$8090	\$8295	\$7898
Dimensions (w x h <sup>4</sup> x d)	13.6 x 11.3 x 15.6	19.3 x 18.7 x 19.5	14.9 x 12.6 x 15.5	16 x 15.8 x 18.7	16 x 16.1 x 19.5	18.8 x 18.8 x 21	18.9 x 20.8 x 19	16 x 14.8 x 17.3
Diagonal size (in inches)	13	21	15	16	16	19	19	16
Picture tube manufacturer	Sony Trinitron	Hitachi	Zenith	Sony Trinitron	Sony Trinitron	Sony Trinitron	Ikegami	Sony Trinitron
Active area (w x h, in inches)	9.3 x 6.9	15.4 x 11.7	10.8 x 8.2	11.6 x 8.8	11.7 x 9.3	13.8 x 10.7	13.7 x 10.8	11.2 x 8.7
Resolution (w x h)	640 x 480	1152 x 870	768 x 576	832 x 624	1024 x 808	1024 x 808	1024 x 768	832 x 656
Pixel density (in ppi)	72	72	72	72	87	75	72	75
Spreadsheet: columns x rows	8 x 29	14 x 59	9 x 36	10 x 40	13 x 54	13 x 54	13 x 51	10 x 42
Vertical refresh rate (in Hz)	66.7	75	67	67	72	71	75	68
Virtual screen	no	no	no	no	no	no	no	no
Screen saver/screen capture	no/no	no/no	yes/no	yes/no	yes/no	yes/no	no/no	no/no
Pan/zoom	no/no	no/no	no/no	no/no	no/no	no/no	no/no	no/no
Tear-off menus/enlarged menus	no/no	no/no	no/yes	no/yes	no/yes	no/yes	no/no	no/no
Automatic centering of windows	no	no	no	no	no	no/no	no	no
Contrast control/brightness control	yes/yes	yes/yes	yes/yes	yes/no	yes/no	yes/no	yes/yes	yes/no
(Convergence controls) vert./hor.	yes/yes	no/no	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
(Centering controls) vert./hor.	no/no	yes/yes	no/no	yes/no	yes/no	yes/no	yes/yes	yes/no
Degauss	manual	manual	auto	auto	auto	auto	manual	auto
Tilt-and-swivel stand	optional	yes	yes	yes	yes	yes	yes	no
Warranty period	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Extended warranty available	no	yes	yes	yes	yes	yes	no	yes

<sup>1</sup> Products that are not yet shipping are indicated by parentheses. <sup>2</sup> Price if bought directly from PCPC.

to hit their phosphor targets accurately), the image goes out of focus and objects acquire red or blue shadows. All tested monitors had good convergence somewhere on the screen, usually in the center. The real test is whether or not convergence is equally good along the edges and in the corners of a display. If convergence varies markedly from one spot to the next, you may need to adjust and readjust convergence to see different parts of the screen clearly. The monitors with the best convergence scores were the Apple display, the three 16-inch monitors, the Radius Color Display, the ColorBoard 708+, and the SuperMac Trinitron Color Display. The monitors with the worst convergence ratings were the ColorPage 15 and the Sigma Designs ColorMax.

### Distortion and Flicker

Not only should focus and convergence be at a maximum and moirés at a minimum, it's important that squares be squares, not rectangles, and circles be circles, not ovals. Macworld Labs

tested for this type of distortion, which is usually most pronounced in the corners, and once again found that the smaller monitors bested the larger ones. However, several 19-inch displays, including the MegaScreen 2008/19, the PCPC II/19, and the SuperMac 19" Trinitron Color Display, also had excellent scores. The most significant distortion was seen in the CalComp ChromaVision, the Radius Color Display, and the Sigma Designs ColorMax.

As is often the case with monitors larger than the SE's built-in screen, the upper left corner was bent a bit out of shape (or otherwise imperfect) in most of the monitors; notable exceptions were the two PCPC displays, the SuperMac color display, the MegaScreen 2008/16, and the Apple monitor. Unlike most monitors, in which the screen image appears flat or slightly bowed outward, the ColorPage 15's screen image had a distinct inward curve that many of our critics found disconcerting. (Although after working with the ColorPage 15 for a few hours you begin to like the sur-

face; other monitors then start to look incredibly rounded, like a bubble.)

A year ago, flicker was a problem in many color displays. In this year's collection, however, only three monitors displayed noticeable flicker: the Relax display and the two PCPC displays. Flicker is caused by a vertical refresh rate that's too low (65Hz to 60Hz or less), resulting in a display that pulses, like a silent movie. Some people see flicker more readily than others; if you can see flicker in a monitor, don't buy it. This computer-age torture may not give you a migraine today, but it will sooner or later (probably sooner). The two PCPC displays are scheduled to be upgraded from 60Hz to 72Hz, and thus should soon be flicker-free; nonetheless, if you are thinking of purchasing a PCPC or Relax monitor, be sure to check it for flicker before you buy it.

### What to Choose?

Not so long ago, I advised monochrome-monitor buyers to go with what their eyes told them was best



MegaGraphics	PCPC	PCPC	Radius	RasterOps	Relax	Sigma Designs	SuperMac	SuperMac
MegaScreen	PCPC II/19	PCPC II/21	Radius	ColorBoard	Relax/Ikegami	ColorMax 8/24	19 Trinitron	19" Color Display
2008/19			Color Display	708+ System	Trinitron System	Display System	Color Display	
\$5948	\$3658 <sup>2</sup>	\$3658	\$6190	\$5790	\$3689	\$6295	\$5799	\$4799
\$9148	\$4858	\$4858	\$9290	\$7995	none	\$400 <sup>3</sup>	\$8199	\$7199
18.8 x 18.8 x 21	18.8 x 18.8 x 21	19.3 x 18.7 x 19.5	18.8 x 18.8 x 21	18.8 x 18.8 x 21	18.9 x 20.8 x 19	18.8 x 18.8 x 21	18.8 x 18.8 x 21	19.2 x 18.5 x 19.5
19	19	21	19	19	19	19	19	19
Sony Trinitron	Sony Trinitron	Hitachi	Sony Trinitron	Sony Trinitron	Ikegami	Sony Trinitron	Sony Trinitron	Hitachi
13.5 x 10.9	14.4 x 10.7	14.5 x 11.6	14.2 x 10.8	14.4 x 10.7	14.3 x 10.6	14.2 x 10.7	14.3 x 10.8	14.4 x 10.6
1024 x 826	1024 x 768	1024 x 768	1152 x 882	1024 x 768	1024 x 767	1024 x 768	1024 x 768	1024 x 768
75	72	72	82	72	72	72	72	72
13 x 55	13 x 51	13 x 51	14 x 60	13 x 51	13 x 51	13 x 51	13 x 51	13 x 51
69	60	60	72	75	70	79	75	75
no	no	no	no	to 8192 x 768	no	no	to 4000 x 1500	to 4000 x 1500
no/no	no/no	no/no	yes/yes	no/no	no/no	no/no	no/no	no/no
no/no	no/no	no/no	no/no	yes/yes	no/no	no/no	yes/yes	yes/yes
no/no	no/no	no/no	yes/yes	no/no	no/no	no/no	no/no	no/no
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auto	auto	manual	auto	auto	manual	auto	auto	auto
yes	yes	yes	yes	yes	yes	yes	yes	yes
1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
yes	yes	yes	no	no	no	yes	no	no

<sup>2</sup> 8-bit board can be upgraded to 24-bit with 16 video RAM chips, at a cost of approximately \$400. <sup>4</sup> Including stand if provided.

and worry about the budget later. After all, you and your monitor will have to work together for years, and minimum eyestrain is worth almost any price. But the price range in color monitors is so great (from \$1650 to over \$9000) that that kind of advice doesn't make much sense. Instead, for those of us who have to watch the bottom line, the choices among 8-bit, Macintosh II color monitors break into three categories.

The first category—systems retailing for less than \$2500—is for the serious budget watcher. Only two systems fall within this group, the Apple High-Resolution Color Display and E-Machines' ColorPage 15. The ColorPage 15 fared poorly in the Labs' tests, and our panel of critics found it wanting, so we can't recommend it. But the Apple display is another story altogether. It remains the best color bargain in town, and it is an easy and obvious choice if color and cost, but not size, are of primary concern.

The next category—systems retailing for between \$2500 and \$5000—

includes all of the 16-inch monitors plus a number of the larger displays. The three 16-inch displays were rated the best of all the monitors in both the Macworld Lab tests and in the opinions of our panel of critics. The E-Machines TX had a slight edge over the other two, although its 87-ppi density may rule it out for some people. Of the 19-inch and 21-inch displays in this price group, the PCPC II/21 is not recommended. The PCPC II/19, on the other hand, was the only large display in this group that received high ratings in both objective and subjective tests. Its flicker problem is currently a serious drawback, but when that is repaired, it will be a top choice among all 19-inch and 21-inch displays.

The final category—systems retailing for over \$4500—contains the remaining 19-inch and 21-inch displays. Clear favorites among our in-house critics, and high scorers in the Labs' tests, were the MegaScreen 2008/19, the ColorBoard 708+, the E-Machines T19, and the SuperMac Trinitron Color Display. The Radius Color Display

also well liked, even though our critics felt it to be somewhat less bright than the others. Not recommended are the CalComp ChromaVision and the Relax/Ikegami Trinitron Display.

Although a small number of monitors did stand out in the eyes of our highly critical critics, the quality of today's crop of color displays is, with few exceptions, relatively high and the variation among them not all that large. There are also more choices in more sizes and prices than ever before. The results of the Labs' tests and the opinions of our critics notwithstanding, these facts may be the best news of all to anyone thinking about purchasing a color display. **M**

See *Where to Buy* for contact information.

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**Robert Eckhardt** is a Macworld contributing editor and author of three books on the Macintosh. When he's not looking at other people's monitors, he's staring at his own as he works on two new Macintosh books.



# TOP *of the* CHARTS

BY DAVID L. FOSTER

To fully appreciate the value of charts and graphs, one need look no further than the average newspaper. Inside the financial section you're likely to find various examples in which volumes of figures have been distilled into a single chart. It's a simple truth that the human mind comprehends visually depicted relationships much faster than it does any compilation of numbers or words. In business, charts state the bottom line—whether sales are going up, flat, or down, a chart tells the story right away.

Chart-making applications come in three basic varieties: spreadsheets, dedicated applications, and presentation programs. Although all the applications discussed here can make simple pie, bar, or line graphs, there are large differences in the quantity and type of data these programs can handle and, just as important, in their ease of use and the quality of their output. Choosing the right program depends on the type of data you need to chart, the message you wish to deliver, and the audience you seek to persuade.

## **A Spreadsheet May Suffice**

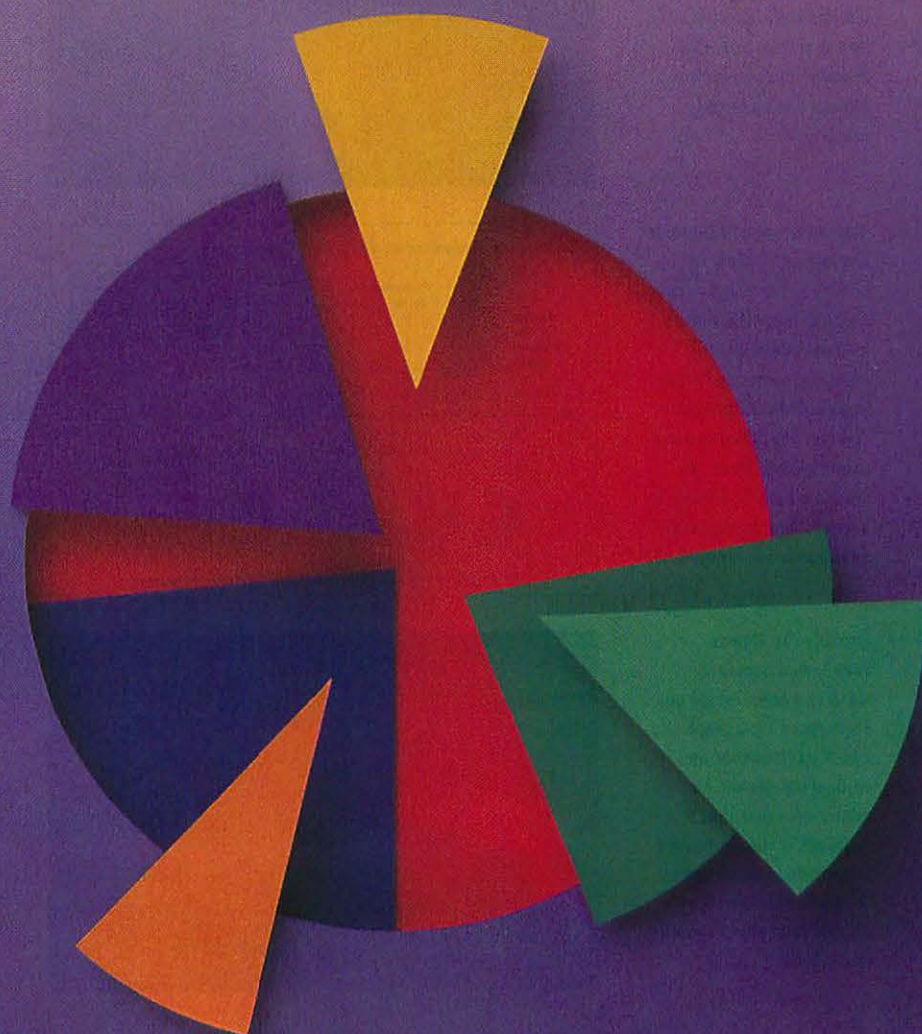
If working with numbers is part of your business, more than likely you already use a spreadsheet capable of creating business graphics. Microsoft Excel, Ashton-Tate's Full Impact, and Informix's Wingz together make up a major portion of the Macintosh spreadsheet market, and all three can turn data into charts. If the graphs you need to create are straightforward and you seldom give formal presentations, any of these spreadsheet programs will fit the bill.

Both Full Impact and Wingz integrate charts and data by floating the charts in a thin, transparent drawing layer above the spreadsheet. Both programs also provide a palette of drawing tools for creating text blocks, rectangles, ovals, and other object-oriented graphic primitives to enhance your charts. The charts are always interactive; if you

DAVID DREYER



ELEVEN PROGRAMS THAT CREATE  
PRESENTATION-QUALITY CHARTS AND GRAPHS





change data on the spreadsheet, the program immediately updates the graph. This dynamic link between the charts and data makes it easy to design template documents that produce stunning business graphics as soon as you insert the appropriate numbers.

Unlike Full Impact and Wingz, Excel charts are created and maintained as separate documents. If you want to place tables of numbers and a chart in a single document, you must combine them in a separate application like Microsoft Word or Aldus PageMaker. Since Excel also lacks the drawing tools provided in

the other spreadsheet programs, you will need to paste an Excel chart into a drawing program like MacDraw or Canvas in order to add pictures or other graphic enhancements. In either case, the final chart is fully severed from the data used to create it. Should you need to alter the data behind a chart, you will have to repeat the whole chart-creation process.

Wingz is definitely the most versatile of these spreadsheets because it can create many more types of charts than Excel or Full Impact. (Full Impact 2.0 will support 3-D charts that let you change the chart's rotation,

elevation, and perspective.) Not only can Wingz create the standard pie, bar, column, area, and combination graphs in three dimensions as well as two, but its repertoire also includes polar, hi-lo (stock), contour, surface, and wire-frame charts. You can resize, rotate, and manipulate the depth and perspective of any three-dimensional chart with considerable ease, although you have to do so by using a dialog box instead of by clicking and dragging on the chart itself.

### Ease of Use

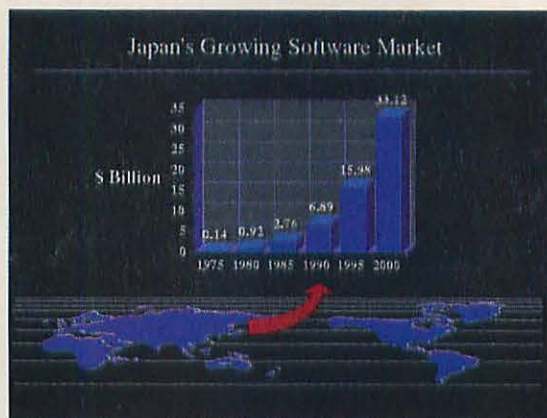
All three spreadsheet programs have distinctive quirks. In Excel, you can easily edit charts by double-clicking on the elements of the chart you wish to modify. In Full Impact and Wingz, however, you often need to pull down menus and access dialog boxes to alter charts. To its credit, Full Impact lets you make some changes directly in the chart. For example, above and below or to either side of a chart the cursor turns into a text-entry I beam, oriented correctly for typing annotations directly into the chart along either axis. To explode a pie-graph segment you need only click on it and drag it.

One peculiar aspect of both Full Impact and Wingz is that the type characteristics of legends, axes, and titles are taken from the ranges of spreadsheet cells that define the chart. If you change the font, size, or color of text in an included range of the spreadsheet, the type in the chart changes, but you can't just click on text in the chart and directly alter its properties. Since you're unlikely to want the same text characteristics in both a spreadsheet and its accompanying graph, this is a real drawback. (Ashton-Tate promises that Full Impact 2.0 will let you format all chart elements directly, including axis labels and individual elements in a legend.)

Wingz forces you to use other convoluted actions as well. For instance, adding a new series of data to an already-existing chart requires a lengthy sequence of copy, paste, and menu actions. Although Wingz's charting capabilities are far more advanced and flexible than those of the other spreadsheets, such quirks often get in the way as you learn to use the program.

### Finishing Touches

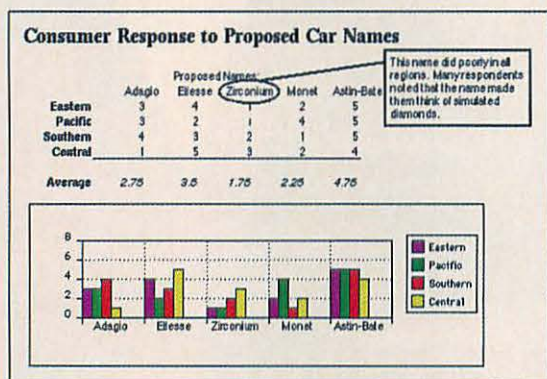
Because Persuasion is designed for creating and organizing presentations, it lacks some of the specialized features found in spreadsheets or dedicated graphing packages. Charts created in Persuasion, however, can be embellished with draw-type objects and imported graphics.



ED BOYLE OF MACNUM DESIGN OF SAN FRANCISCO

### Adding Graphs to Reports

Full Impact's ability to combine charts and data in a single document makes it an excellent tool for creating reports and other business presentations. You can use drawing tools to add circles, lines, arrows, and blocks of text to a graph, thereby drawing attention to important data.



### Flexible Pie Charts

With Visual Business No. 5 you can explode any segment of a pie graph and adjust its thickness and vertical placement. No matter how you alter a segment, it always casts a congruous shadow; these shadows help the chart display solid objects more realistically.





All three spreadsheets offer macro capabilities that can considerably simplify routine charting, but business users will find Excel's macro language somewhat Byzantine in comparison to the more English-like syntax used by Full Impact and Wingz. Wingz's macro abilities are especially nice: macros can easily be attached to objects and controls like buttons, much as scripts are in HyperCard. With surprisingly little effort it's possible to create an on-screen presentation that anyone can browse through by simply clicking buttons on each sequential screen or on a master menu display.

All three spreadsheet programs work with color, but while Excel and Full Impact are limited to the basic eight, the number of colors in Wingz documents is limited only by the color capabilities of your Macintosh. If you have a 24-bit color board, you can incorporate any of 16.7 million colors in your graphics. All three spreadsheet programs can handle the amount of data usually required in business charting, but in terms of sheer capacity Wingz is clearly number one, with the ability to plot—memory permitting—up to 32,000 points per series.

Overall Wingz is the most versatile of the three spreadsheets, and I was able to create my snazziest charts with it. And Claris Corporation plans to add Wingz charting capabilities to its database manager, FileMaker. However, Full Impact and Excel are considerably easier to master. And, when released, Full Impact 2.0 will contain many more features, such as 3-D charts, overlay capabilities, and alignment tools for page-layout. Although Excel may be the standard spreadsheet program in many offices, people who frequently create graphs should consider adding Full Impact or Wingz to their software libraries.

### Dedicated Programs

If you need a wider range of charting types and options than a spreadsheet program provides, you may prefer to use an application that specializes in creating and formatting charts. The best way to envisage the relationship between these programs is to picture an evolutionary tree in which Micro-soft Chart is an ancient fossil (Micro-soft stopped supporting the product

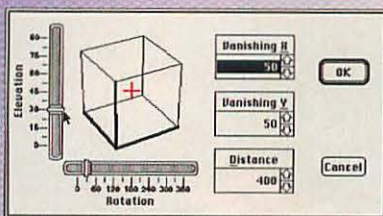
in late 1989), Computer Associates' CA-Cricket Graph is a low branch that's not yet extinct, and DeltaPoint's DeltaGraph is the culmination, an application suited for creating almost any type of chart. In this picture, Synergy Software's Kaleidagraph occupies a position close to that of DeltaGraph, but on a separate branch due to its special mathematical and technical capabilities. Visual Business Systems' Visual Business No. 5 is in a tree of its own, providing neither the range of charting types nor the mathematical capabilities of the other programs but delivering charts of astonishing quality with little or no effort. All of these applications hold the data used to create charts in worksheets similar to spreadsheets.

CA-Cricket Graph and Kaleidagraph are similar in appearance and function, but in most areas Kaleidagraph is bigger, better, and faster. Both

## FOR CREATING GRAPHS, CONSIDER ADDING FULL IMPACT OR WINGZ TO YOUR SOFTWARE LIBRARY

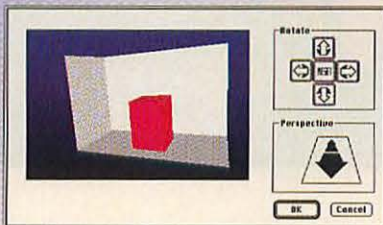
programs handle the standard 2-D chart types and provide palettes full of drawing tools. But a big difference between the two is that you can establish links between Kaleidagraph's graphs and the data files used to create them. And in Kaleidagraph, data from several different files can be consolidated into a single chart—a feat that can't be accomplished in CA-Cricket Graph. (This feat can, how-

### THREE WAYS TO 3-D



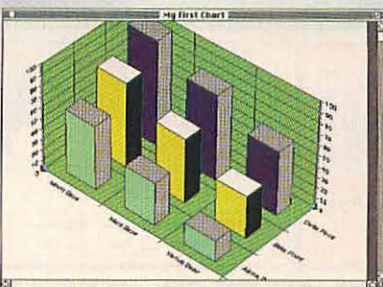
#### Wingz

In Wingz the point of view and the depth perspective used to display the chart can be changed by clicking and dragging on slider controls in a dialog box.



#### Visual Business No. 5

By clicking on the arrows, users of Visual Business No. 5 can rotate and tilt three-dimensional charts and control the depth perspective. As you make alterations, the image changes accordingly.



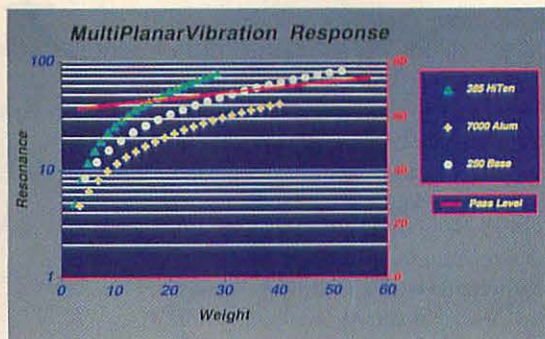
#### DeltaGraph

In DeltaGraph's three-dimensional charts, the length of each axis can be altered by dragging the control points at the end of each axis. Moving a control point closer to the center of the graph shortens the corresponding axis; moving the control point away from the center of the graph lengthens the axis.



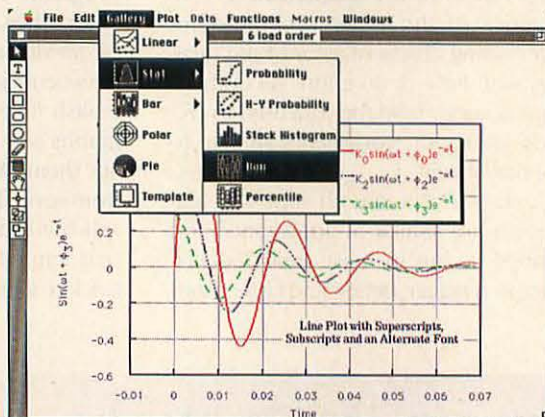
### Overlay Charts

DeltaGraph produces specialized graphs. Here one line chart has been set on top of another one in order to compare two sets of data. The red line corresponds with the red y-axis, while the three lines composed of symbols correspond to the logarithmic x-axis denoted in blue.



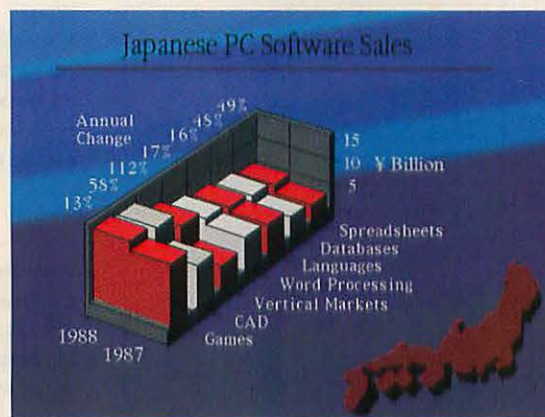
### Graphing Complex Data

Kaleidagraph excels at graphing complex or massive collections of data. The line plot displayed in the background here can be changed to any of the chart types represented in the Gallery menu. Kaleidagraph also supports super- and subscripts in equations and can rotate type.



### Three-Dimensional Effects

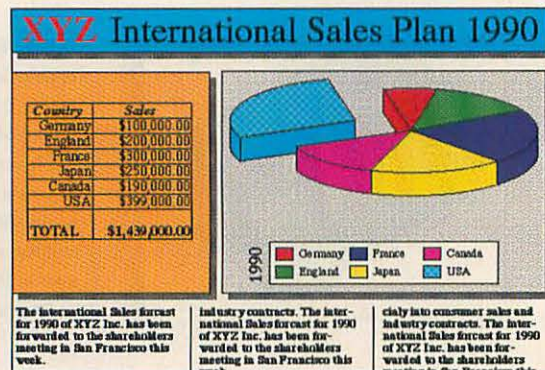
Wingz may be harder to master than Full Impact or Excel, but once you know how to work the program you can easily create eye-catching charts like the 3-D bar chart shown here.



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### Multipurpose Charting

RagTime 3 is not only a charting package—it also contains full-featured page-layout and spreadsheet applications. RagTime 3 is an excellent choice if you frequently need to add presentation graphs to reports.



The international sales forecast for 1990 of XYZ Inc. has been forwarded to the shareholders meeting in San Francisco this week.

Industry contracts. The international sales forecast for 1990 of XYZ Inc. has been forwarded to the shareholders meeting in San Francisco this week.

cially into consumer sales and industry contracts. The international sales forecast for 1990 of XYZ Inc. has been forwarded to the shareholders meeting in San Francisco this week.

ever, be easily accomplished in Excel so long as all the data series being plotted contain an equal number of data points.) Kaleidagraph also includes a built-in programmable calculator modeled after Hewlett-Packard's technical calculators. Look to Kaleidagraph if you want a program with macro capabilities and don't need to create 3-D plots.

DeltaGraph's numerous charting capabilities and extensive import and export facilities make it one of the best charting applications available. DeltaGraph can create 22 different types of two- and three-dimensional charts in as many colors as your Macintosh can handle. Like Wingz, DeltaGraph can plot three variables simultaneously to create either a surface or a wire-frame chart that could be used, for example, to depict elevation over a parcel of land or describe a complex mathematical function. Unlike in Wingz charts, the individual axes of DeltaGraph's 3-D plots can be resized by selecting and dragging on the charts (although you still need to use a dialog box to rotate a 3-D plot or change the viewing angle). DeltaGraph's palette of drawing tools provides the means to create arcs, bezier curves, and complex polygons in addition to the standard set of graphic primitives that are available in CA-Cricket Graph and Kaleidagraph. DeltaGraph is also the only program that lets you fill chart components or graphic objects with graduated fill patterns that blend from light to dark horizontally, vertically, or radially. These special effects can help you create graphics that look distinctive and demand attention.

An especially handy feature of DeltaGraph is its ability to link Excel 2.2 and DeltaGraph files. If the data in a linked Excel file is altered, DeltaGraph data files and charts can be updated to reflect the changes. DeltaGraph can export charts in PICT, EPS, and Adobe Illustrator formats, making it easy to spiff up a chart using a PostScript graphics editor like Adobe Illustrator or Aldus FreeHand. Thus, you can convert a chart created in DeltaGraph into the type of pictorial chart frequently found in newspapers like *USA Today*—graphs in which the sloping roofs of homes define rising real estate prices, for example.



Visual Business No. 5 defines a category all its own. While this program doesn't offer mathematical capabilities and doesn't let you plot as much data as DeltaGraph or Kaleidagraph, it lets you create graphs of stunning quality with great ease. For instance, you can control depth perspective and point of view for three-dimensional charts. You can explode any segment of a pie graph and control its thickness as well as its vertical placement. Charts can appear against backgrounds that gradually blend between two or even three colors in any of several directions or even radially from a point of your choice. And you can place color graphics into charts. Added text can be transformed into three-dimensional objects, rotated, and twisted to create effects like the scrolling prologue of a Star Wars movie. Since the program uses outline fonts, you can print such transformed text, in high quality, on several popular color printers and to a variety of film recorders using an accessory program called the Output Manager. Visual Business No. 5 isn't cheap, but if you routinely need to create colorful graphics that leave an audience breathless, Visual Business No. 5 is well worth considering.

All of the dedicated charting applications discussed here are easy to operate. In most of the programs, all that's required to change a chart element, like an axis or legend, is a click or double-click on the item to access the appropriate pop-up menu or dialog box. DeltaGraph is the easiest to operate, and its ability to access and form links with Excel files is a big plus—making it the overall winner in the dedicated program category.

#### **Presentation Programs that Chart**

If your charting needs aren't especially demanding you might be able to satisfy them by using an application that includes charting as part of its repertoire. Aldus Persuasion, CA-Cricket Presents, Microsoft Works, and RagTime 3 can all generate and incorporate charts into presentation graphics.

Persuasion and CA-Cricket Presents are specifically designed to create presentations. Although their charting modules are sufficient for relatively straightforward tasks, they're

not nearly as powerful or versatile as the spreadsheets and the dedicated applications. Charts in CA-Cricket Presents, for example, are limited to series that contain no more than 25 values. Persuasion goes a bit farther, with a ceiling of 32 points per series. Neither program can create 3-D charts, and neither provides the means to easily manipulate or mathematically transform data. You cannot even paste data into CA-Cricket Presents worksheets, you can only import or enter data item by item. True to their function as desktop presentation programs, Persuasion and CA-Cricket Presents let you embellish charts with a wide variety of draw-type objects and imported graphics, like company logos. For dramatic effect you can display graphics against backgrounds with spectacular graduated fills. As might be expected, both programs provide

## TO CREATE EFFECTS LIKE THE SCROLLING PROLOGUE OF A STAR WARS MOVIE YOU CAN TWIST TEXT

full support for color, although CA-Cricket Presents isn't yet fully compatible with 32-bit QuickDraw.

Microsoft Works and RagTime 3 are perhaps best described as multifunctional programs, since you can create a wide variety of documents with either application. Works integrates spreadsheet, word processing, database, charting, and telecommuni-

## **MORE TO COME**

**I**n addition to the products reviewed in the main article (all currently available), I looked at a couple of other programs that are in development. A new version of More II, More 3.0, from Symantec will include a companion charting application called (no surprises here) MoreGraph. The program is quite solid—I didn't encounter any crashes or other nasty surprises. Used in conjunction with More II in a MultiFinder environment, MoreGraph will give More II users the chart-making capabilities that Aldus Persuasion and CA-Cricket Presents users have had for some time. MoreGraph, in fact, outstrips the charting modules of its competitors. For instance, MoreGraph can handle as many as 255 data values per series and up to 255 categories. It can also import data directly from Excel 2.2. And like DeltaGraph it can establish a warm link, that is, MoreGraph can alert you whenever the data in a linked Excel worksheet is modified.

MacGraph from Bravo Technologies is a dedicated chart-making ap-

plication that excels in making two-dimensional graphs with eye-catching fill patterns that blend from one color to another. MacGraph makes heavy use of pop-up and hierarchical pull-down menus. Some people will like the emphasis on mousing, but I found that this interface makes actions more convoluted than they need to be. In addition, a floating palette that's crucial to the program's operation is a nuisance on the SE's small screen because the palette often gets in the way of the work area. MacGraph's data worksheets act much like spreadsheets, supporting formulas and operations like duplicate, fill down, and fill right. Bravo promises that the released version will import data in a variety of Mac and PC file formats, including Lotus's 1-2-3 and Excel. This feature has not yet been implemented—MacGraph is much less finished than MoreGraph. It's hard to be sure when working with an unfinished product, but it seems that MacGraph will find DeltaPoint's DeltaGraph a formidable competitor.



## CHARTING FEATURES COMPARED

	CA-Cricket Graph	CA-Cricket Presents	DeltaGraph	Microsoft Excel	Full Impact	Kaleidagraph	Aldus Persuasion	RagTime 3
Company	Computer Associates	Computer Associates	DeltaPoint	Microsoft	Ashton-Tate	Synergy	Aldus	RagTime USA
<b>Price</b>	\$195	\$495	\$195	\$395	\$295	\$249	\$495	\$599
<b>CHART TYPES</b>	10	7	25	7	7	13	8	7
Number supported <sup>1</sup>	yes	yes	yes	yes	yes	yes	yes	yes
Contour and surface (x, y, z)	no	no	yes	no	no	no	no	no
Polar	yes	yes	yes	no	no	yes	no	no
<b>SPECIAL EFFECTS</b>								
Simple depth perspective	yes	yes	yes	no	no	yes	yes	yes <sup>2</sup>
Full 3-D	no	no	yes	no	no	no	no	no
Graduated fills	no	yes	yes	no	no	no	yes	no
Linear, logarithmic, polynomial curve fitting	yes	no	yes	no	no	yes	no	no
User-defined curve fitting	no	no	yes	no	no	yes	no	no
Error bars or hi-lo graphs	yes	no	yes	no	yes	yes	yes	no
<b>FILE IMPORT/EXPORT CAPABILITIES</b>								
ASCII (text)	I, E	no	I, E	I, E	I, E	I, E	I, E	I, E
SYLK	I	I	I	I, E	I, E	no	no	no
DIF	no	no	no	no	I, E	no	no	no
Excel 2.2	no	no	I	NA	no	no	no	I
1-2-3	I	no	I	I, E	no	no	I	no
PICT	I	I	I, E	no	I, E	I, E	I	I
EPS	no	no	I, E	no	no	no	I	I
TIFF	no	no	no	no	no	no	no	I
Illustrator	no	no	E	no	no	no	no	no
<b>FORMATTING</b>								
Maximum number of colors available	8	256	16.7 million	8	8	8	16.7 million	16.7 million
Superscripts and subscripts	no	yes	yes	no	no	yes	yes	yes
Text kerning	no	yes	no	no	no	no	no	yes
Number of symbols for a series	48 <sup>4</sup>	16	76	7	6	20	12	36 <sup>5</sup>
Number of alternate line styles (line plots)	6	28 <sup>6</sup>	32 <sup>6</sup>	8	0	10	39 <sup>6</sup>	56 <sup>6</sup>
Alterable line width (line plots)	yes	yes	yes	yes	no	yes	yes	yes
<b>DRAWING TOOLS</b>								
Lines	yes	yes	yes	yes <sup>7</sup>	yes	yes	yes	yes
Boxes/ovals	yes/yes	yes/yes	yes/yes	no/no	yes/yes	yes/yes	yes/yes	yes/no
Complex polygons	no	yes	yes	no	no	no	yes	no
<b>OTHER FEATURES</b>								
Maximum number of points per series	2700	25	10,000	2000	1024	32,000	32	8000
Maximum series per chart	100	5	256	256	32	20	32	no limit
Supports chart overlays or multiple charts	yes	no	yes	no	yes	yes	yes	yes
Math (spreadsheet capabilities)	yes	no	yes	yes	yes	yes	no	yes
Links data (with graphs/with external files)	no/no	yes/no	yes/yes	no/no	yes/no	yes/no	yes/no	yes/yes <sup>1</sup>
Macros (for chart formats for programs)	yes/no	no/no	no/no	no/yes	no/yes	yes/yes	yes/no	no/yes
Slide service drivers included	no	yes	no	no	no	no	yes	yes

<sup>1</sup> All programs in table support the following standard charts: line, column, bar, stacked column or bar, area, pie, and scatter (x, y).

<sup>2</sup> For pie graphs only.

<sup>3</sup> With external function only.

<sup>4</sup> 17 distinct shapes.

<sup>5</sup> 10 distinct shapes.

<sup>6</sup> About 10 are practical for connecting data points.

<sup>7</sup> With arrows only.

cations modules with a set of drawing tools. However, Works' charting capabilities are terribly anemic in comparison to most of the other applications, and the method by which you create charts isn't intuitive. But you can import charts created from data in a Works spreadsheet into Works' word

processing environment, where they can be considerably enhanced using Works' drawing tools. Works is an economical program capable of performing many functions in addition to creating simple business charts. However, generating charts suitable for presentations will take considerably more



Visual Business No. 5	Wingz	Microsoft Works
Visual Business	Informix	Microsoft
Systems	Software	
\$395	\$399	\$295
7	20	7
yes	yes	yes
no	yes	no
no	yes	no
yes	yes	no
yes	yes	no
yes	no	no
no	no	no
no	no	no
no	yes	no
I	I, E	I, E
I, E	I, E	I, E
no	I, E	no
I	I, E	no
no	I, E	no
I, E	I, E <sup>3</sup>	no
I	no	no
I	no	no
no	no	no
16.7 million	16.7 million	8
no	no	yes
no	no	no
10	16	4
0	39 <sup>4</sup>	0
yes	yes	yes
yes	yes	yes
yes/yes	yes/yes	yes/yes
no	yes	yes
2500	32,500	80
256	32,500	4
yes	yes	yes
no	yes	yes
yes/no	yes/no	yes/no
yes/no	no/yes	yes/no
yes	no	no

effort with Works than with other programs.

RagTime 3 combines page-layout, spreadsheet, and charting functions. Rectangles (frames in RagTime vocabulary) containing spreadsheets or charts can be created and positioned on pages together with frames contain-

ing either text or graphics. Working with frames to create graphs may seem a bit strange at first, but it does have some advantages. For instance, you can create a chart by entering references to specific spreadsheet cells or values into a chart frame's status bar. This feature makes it possible to consolidate data contained in different spreadsheet frames into a single chart. In addition, you can overlap multiple frames to achieve a variety of eye-catching effects.

Since RagTime was designed to support page layout, the program offers excellent text-manipulation capabilities, such as fully controllable kerning and leading as well as fully adjustable super- and subscripting. But the program lacks some of the drawing tools (ovals and complex polygons) provided by Aldus Persuasion, Cricket Presents, and even Microsoft Works. RagTime can, however, handle much larger data sets than these programs (as many as 8000 values or series).

If giving presentations is a major part of your job, Aldus Persuasion's outlining capabilities and templates will go far in helping you assemble and organize your graphics. Keep in mind that should you choose either Persuasion or CA-Cricket Presents you may still require a spreadsheet or dedicated charting application to create particularly complex charts. If you are looking for a program that can pull double or triple duty, take a serious look at RagTime. It handles word processing, forms processing, simple spreadsheet applications, and page-layout functions, in addition to charting. Microsoft Works might be a workable solution if your budget is limited and your graphics simple, but due to its serious limitations I can't recommend Works for creating presentation-quality business charts.

### Picking a Charting Program

All of the programs discussed here are capable of generating standard types of charts—including bar, pie, and line charts—and most let you alter characteristics such as the colors of chart elements or the size and content of text legends. But the programs differ considerably in their ability to handle large data sets and to produce snazzy charts. Although it's difficult to give

## IF YOU'RE LOOKING FOR A PROGRAM THAT CAN PULL DOUBLE OR TRIPLE DUTY, CHECK OUT RAGTIME

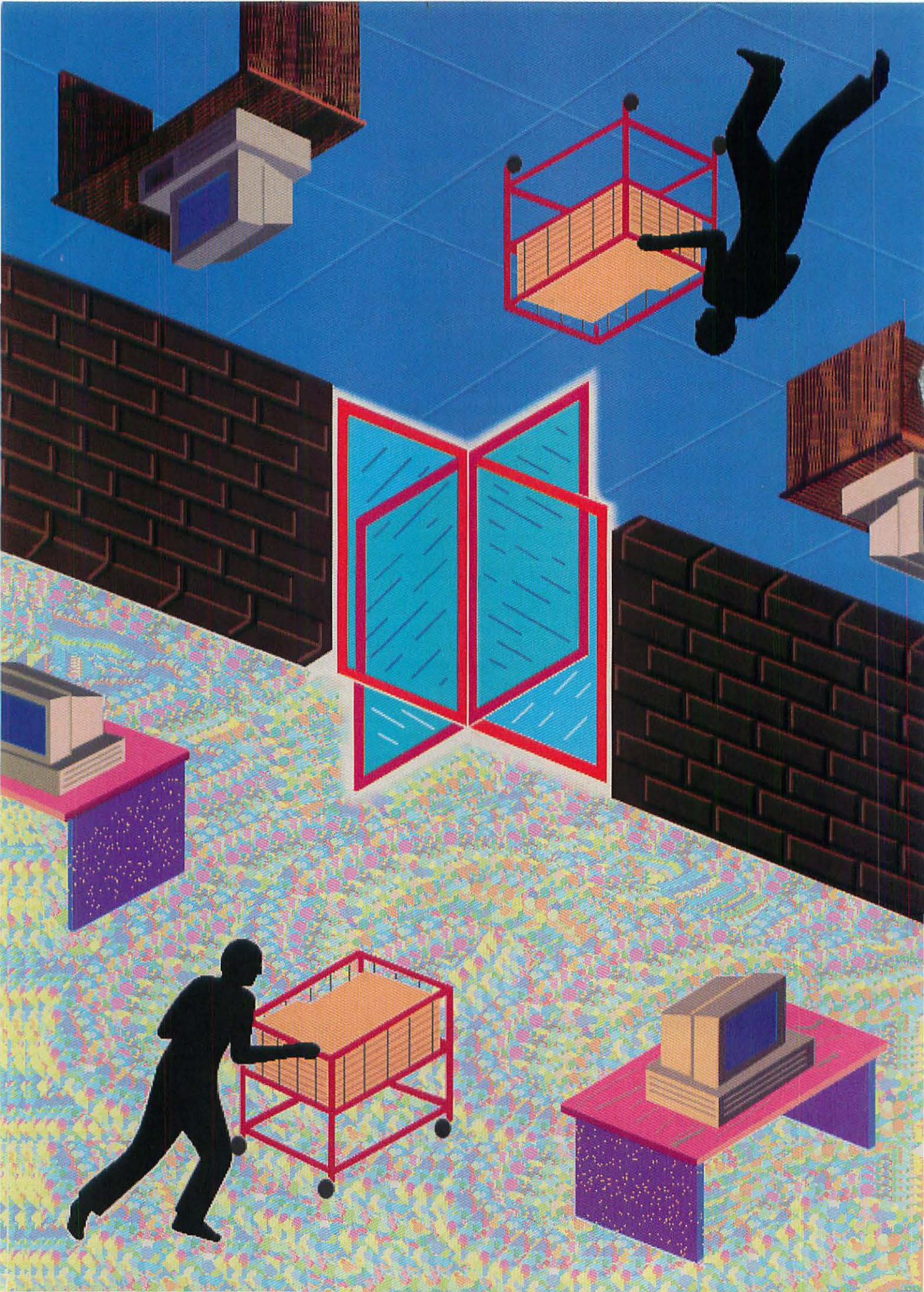
the nod to a single application, Delta-Graph comes close to being a universally acceptable program for creating business charts and graphs. Its ability to link to Excel spreadsheets is very convenient, especially if you're already using Excel for number crunching. If you're visually inclined, DeltaGraph's ability to export charts in several graphics formats will enable you to enhance your graphs as much as your imagination, and artistic talent, will allow.

If form and style are at least as important as substance in getting a point across, Visual Business No. 5, with its superb graphics-generating ability, also deserves consideration. This program, however, should be considered an adjunct to a spreadsheet or other application that can properly prepare the values you intend to chart. If you frequently create lengthy presentations, think seriously about using a desktop presentation program like Aldus Persuasion to organize your graphics, no matter what program you've chosen to create them. Finally, don't be afraid to consult a graphic artist or other specialist. Although most of these programs are capable of producing impressive, even stunning, business graphics, they come with no guarantee that you'll use them effectively. That comes primarily with experience. **M**

See *Where to Buy* for contact information.

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# MAC DOSSIER

Tearing down the walls



between Macs and PCs

**N**ot long ago, a Macintosh in the office seemed as unlikely as a television reporter in the Kremlin—you almost expected either one to be hustled out of the room before anyone had a chance to get a good look. How times change. Moscow now welcomes television cameras, and the Mac routinely shares business computing duties with the once-hostile IBM PC.

Despite the historic breakthroughs, differences in language, system, structure, and expectations continue to confound those attempting to take advantage of improved relations. Just as human translators facilitate the exchange of information between superpowers, electronic file-transfer applications are employed to permit communication between Macs and PCs. (For the purposes of this article, "PC" refers to any IBM-compatible computer running the MS-DOS operating system.)

The free-market system has produced roughly a dozen methods for transferring files between the two electronic platforms. Some products simply move files between machines; others provide translation features. Negotiations

between the PC and Mac camps are still in progress; let's listen in to learn the basics behind file exchange and to discover which type of file-transfer product best meets your needs.

## Getting There

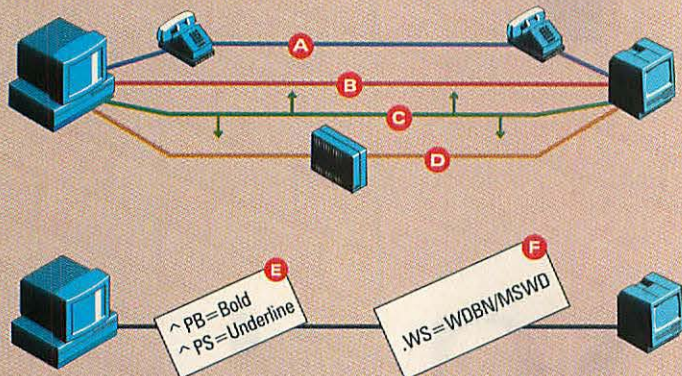
There are four basic ways to move documents between Macs and PCs, and each has its pros and cons.

- *With a disk drive* Using special software, several floppy drives (including the 1.4MB Apple External FDHD SuperDrives built in to today's Macs) can directly access MS-DOS floppy disks. The pros: This scheme is easy and convenient. The cons: It can be slow. Also, the limited capacity of floppies makes this option unsuitable for moving large numbers of files or large documents such as scanned images.

- *With a file-transfer package* Products in this class include a cable that connects to each machine's serial port (or LocalTalk port, in some cases), along with specialized communications software for each machine. The pros: You can swap files that won't fit on a floppy. Most packages can also use modems to transfer files over



## GETTING THERE



To move documents between Macs and PCs, you can use a modem and communications software (A), a direct serial-cable connection (B), a network (C), or a disk drive that reads and writes both platforms' formats (D). If the destination application can't read the original document, you'll need to use a file-translation utility, which translates (E) the formatting codes in the original document (two codes for Micropro's WordStar word processor are shown here) into codes a Mac application can understand and then creates a Mac file (F) whose type and creator codes enable you to open the document from the Finder.

phone lines, which is handy when the machines aren't close enough for a direct cable connection. Also, these packages often include niceties, such as password protection that guards against unauthorized access and a logging feature that records who has accessed your machine. The cons: You need to learn (and reserve disk space for) the transfer software. And you need to juggle cables if you normally connect other devices to your serial ports.

■ **With a network** If you equip a PC with a LocalTalk expansion board, you can connect the PC and Mac using either file-server software such as TOPS or AppleShare, or electronic mail software such as Microsoft Mail, TOPS' InBox, cc:Mail's cc:Mail, 3Com's 3+ Mail, or CE Software's QuickMail. The pros: Networks are relatively fast and very convenient, especially if you transfer files frequently. Each camp can access the other's hard disks, opening files directly or transferring them using the Finder. And a LocalTalk-equipped PC can share a PostScript laser printer with Macs. The cons: Networks are relatively expensive. PC

LocalTalk boards cost a few hundred dollars, plus \$50 to \$75 for each network connector kit. Networks require setup and maintenance time, and their software reduces the amount of memory available for programs.

■ **With communications software and a cable or modems** If you already have Mac and PC communications programs, you can swap files using modems or a null modem cable, a cable wired for direct serial communications (the ImageWriter I cable works well). If you use modems, you can upload files to a communications service and then download them to the other platform. The Connect Business Information Network is an ideal transfer medium—its Mac and PC software work almost identically. The America Online service will soon be available for PCs, and MCI Mail subscribers can already use Dow Jones & Company's Desktop Express on the Mac or Lotus's Express on the PC. The pros: Cable and modem file transfers are inexpensive, particularly if you already own the communications software. And information services allow for convenient "drop boxes," eliminating the

need for both parties to be at their machines at the same time. The cons: This method is slow and filled with technical hurdles. And because you're charged for the time you spend online, information services can be costly for large transfers.

In this article, I concentrate primarily on the floppy-disk and cable transfer approaches, since they provide all the transfer and translation features most people need. (For details on network electronic-mail software, see "E-Mail: A Postal Inspection," *Macworld*, June 1990. For background on online services, see "Getting Started with Communications," May 1990.)

## Speaking the Language

Getting to a foreign country is one thing; communicating with its citizens is another. Similarly, when swapping files between platforms, you need to ensure that a Mac or PC program can interpret the transferred files. That's relatively easy if you're moving files between programs available on both platforms. The Mac version of Microsoft Word, for example, can swap documents with its PC counterpart, as can the Mac versions of Aldus PageMaker, Microsoft's Excel and Works, WordPerfect, and Adobe Illustrator; Ashton-Tate's FullWrite Professional, for the Mac, can open documents created by Ashton-Tate's MultiMate, for the PC. Most Mac and PC database managers and spreadsheets can exchange data either through their own file formats or through interchange formats such as SYLK and DIF.

There are also several interchange formats designed for swapping formatted text or graphics. For text, the best of the bunch is the rich text format (RTF), supported by Microsoft Word and PageMaker (Mac and PC versions for both), as well as T/Maker's WriteNow and MacWrite II version 1.1. Document content architecture (DCA) is another popular text-interchange format, but it doesn't retain as much formatting information as RTF. To exchange graphics files, you can use the tagged-image file format (TIFF) for bitmapped images, or encapsulated PostScript (EPS) for object-oriented PostScript images. Many PC programs can read MacPaint files.

Any two text-oriented programs



can swap data using ASCII (text-only) format, but you must keep in mind that there's a potential trouble spot in this lowest-common-denominator method. The PC signifies line endings with two codes—a carriage return and a line feed—while the Mac needs only a carriage return. When you transfer a text-only file to the Mac, you need to use a transfer utility that removes line-feed codes. You can also use a shareware Mac utility called Macify, by Eric Celeste, to remove line feeds.

To transfer files between programs with dissimilar file formats, you need software that can translate the data into a form the destination application can recognize. As we'll see shortly, many file-transfer products include such translation features. The Mac's system software also includes a capable translation program called Apple File Exchange.

### What's Your Signature?

Another aspect of file exchange concerns how a Macintosh user opens a transferred document. Ideally, you should be able to double-click on a transferred document's icon to automatically start the appropriate program. In some cases, however, transferred documents appear with the generic document icon (a blank page with one corner turned down). If you double-click on a generic document, you get an error message that states that the file can't be opened because the application is missing. Chances are the application isn't missing; the Mac just doesn't know which one to start. You can sometimes open a generic icon file by going to the appropriate application's Open dialog box; if the file appears, you can probably open it.

To associate documents with their applications, the Mac uses invisible *file signatures*. A document has two 4-character signatures—one that specifies the document's creator, the other specifying the document type. For example, the creator for an Aldus PageMaker 3.0 document is ALD3, while its type is ALB3. When you double-click on a document icon, the Mac consults the creator signature to determine which application to start. The application determines—by checking the type—which documents it can open and lists them in a dialog box.

The PC works in a similar way, although a bit more crudely. MS-DOS file names are limited to 8 characters plus a 3-character *extension*, which appears after a period, as in FILENAME.TXT. The extension usually associates documents with their applications. For example, a PageMaker document has the extension PM3; its full name might be BROCHURE.PM3 or NEWSLETR.PM3. In the Microsoft Windows operating environment, double-clicking on any file with the PM3 extension starts PageMaker and opens the file.

Most file-transfer programs automate the document-association process with a technique called *extension mapping*, in which each PC file extension corresponds to a set of Macintosh signatures, and vice versa. When the Mac transfer program receives a PC file with a given extension, it automatically assigns the corresponding type and creator codes to the Mac version of that file. Similarly, when you move a file to the PC, the transfer program attaches the appropriate extension to the file. Most file-transfer products include extension maps for common dual-platform applications—such as Excel, Word, WordPerfect, and PageMaker—and also let you modify the extension maps to better suit your software library. For example, if you

use Full Impact, you might want to modify the extension map so that transferred 1-2-3 files get Full Impact's signature instead of the customary Excel's.

Extension mapping is a great convenience, but it isn't essential. You can change a file's type and creator codes yourself using Apple's ResEdit utility or a desk-management desk accessory such as CE Software's DiskTop or Electronic Arts' DiskTools II. Plus, you can usually force an application to open a document with a different type code (provided the application supports that file format): select the icons of both the application and the document, and then choose the Finder's Open command. On the PC, you can simply rename the file to change its extension.

With the basics out of the way, let's take a closer look at the contenders in the floppy disk and cable transfer factions.

### Disk Drive—Transfer Products

For transferring files via floppy disks, you can choose between Apple's SuperDrive floppy drives, Kennect Technology's Drive 2.4, and Dayna Communications' DaynaFile. And in a variation on the disk-transfer theme, Iomega's Bernoulli Box II removable

## DISK-TRANSFER TOOLS

Product	Drive 2.4/Rapport	SuperDrive	DaynaFile	Bernoulli Box II
Vendor	Kennect Technology	Apple Computer	Dayna Communications	Iomega Corporation
Connection method	internal or floppy drive connector	internal or floppy drive connector	SCSI connector	SCSI connector
DOS disks appear on desktop	yes	no <sup>1</sup>	yes	yes <sup>2</sup>
Supports 5¼-inch DOS disks	no	no	yes	no
Maps file extensions	no	yes	yes	yes
Customizable extension maps	NA	no <sup>3</sup>	yes	yes
Works on Mac Plus	yes	no <sup>4</sup>	yes	yes
List price	\$495, Drive 2.4 \$295, Rapport	\$629 <sup>5</sup>	\$650–\$850, 1 drive <sup>6</sup> \$905–\$1105, 2 drives <sup>6</sup>	\$2799, 2 drives \$1799, 1 drive
	\$69, Mac II family adapter			

<sup>1</sup> Yes, with Dayna's DOS Mounter utility. <sup>2</sup> PC Bernoulli cartridges appear when used with Bernoulli File Exchange.

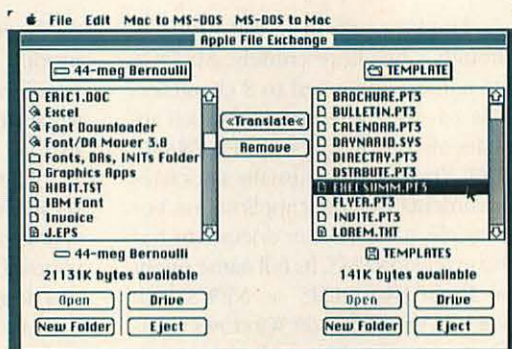
<sup>3</sup> Apple File Exchange extension maps are modified by adding translator files, usually created and supplied by a software developer.

<sup>4</sup> You can use the external SuperDrive on a Mac Plus by adding Kennect's Rapport adapter. <sup>5</sup> Upgrade price for internal drives depends on Mac configuration.

<sup>6</sup> Contact dealer for specifics.

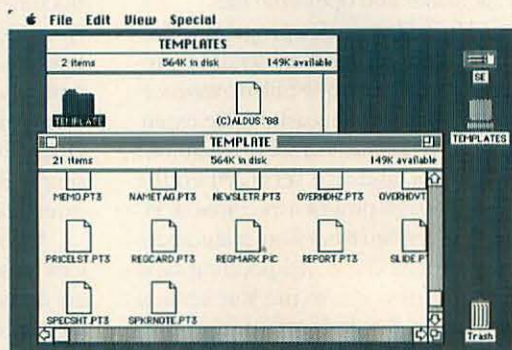


**Swapping Files, Apple Style**  
Apple File Exchange, included with the Mac's system software, lets you use the Mac's SuperDrive to directly access 3½-inch MS-DOS disks. The Mac to MS-DOS and MS-DOS to Mac menus list available translators. Here, a PC PageMaker template file is being transferred.



### DOS on the Desktop

With Dayna Communications' DOS Mounter, you can work with MS-DOS floppies using the Finder. MS-DOS subdirectories appear as folders. Shown here: the Templates disk from the PC version of PageMaker. Iomega's Bernoulli File Exchange is a specialized version of DOS Mounter that lets you work with PC Bernoulli cartridges on the desktop.



drives let you transfer roughly 30MB of data at a time. "Disk-Transfer Tools" summarizes these products' features.

**SuperDrive** All currently manufactured Macs except the Plus include at least one SuperDrive (upgrades are also available for older SEs and for the original Mac II). When used with the Apple File Exchange (AFE) utility, a SuperDrive can directly read from and write to 720K and 1.4MB MS-DOS disks (see "Swapping Files, Apple Style"). To do this, start AFE and then insert the MS-DOS disk. Next, use the Mac to MS-DOS or the MS-DOS to Mac menu to select the desired translator. A translator is a separate file that resides in the same folder with AFE and tells AFE how to interpret the source document and whether to translate it into a different format, mapping its file extension to the appropriate file signature or extension. Finally, select the files to be transferred and click Translate.

The AFE-SuperDrive combo works well, but it's often easier to use the Finder to copy files back and forth, especially when they don't require translation. A problem arises, however, when the Finder can't read a DOS disk and asks if it should initialize it. The solution? Dayna Communications'

DOS Mounter, a start-up document (INIT) that allows you to work with MS-DOS disks using the Finder (see "DOS on the Desktop"). DOS Mounter also does extension mapping and lets you modify extension maps.

**Drive 2.4 and Rapport** Kennect Technology's Drive 2.4 is a 3½-inch external floppy drive; Rapport is a disk-controller adapter that attaches between the Drive 2.4 and the Mac's external floppy connector or the Mac II's internal floppy cable. Together, Drive 2.4 and Rapport provide a powerful and affordable alternative to Apple's SuperDrive. And unlike the SuperDrive, they're compatible with Mac IIs, Pluses, older SEs, and even the lowly 512K.

From a file-transfer perspective, Drive 2.4 and Rapport work like an Apple SuperDrive—they let you access MS-DOS disks from within AFE. They also work with Dayna's DOS Mounter. And as an added bonus, they let you initialize high-density floppies as whopping 2.4MB disks—almost twice their normal capacity. This is great for backing up hard disks, but keep in mind that you can't use a 2.4MB floppy in anything but a Drive 2.4.

If you already have an external

SuperDrive, you can use it with a Mac II, Plus, 512K, or older SE by buying only the Rapport adapter. If you don't own a SuperDrive, buy Drive 2.4 instead: it stores more and costs less.

**DaynaFile** Dayna Communications pioneered Mac-PC relations in 1985 with MacCharlie, an awkward add-on that allowed the 512K Mac to run MS-DOS programs. Dayna has since gone on to better things, and DaynaFile, a PC-disk drive system, is one of them. It connects to the Mac's SCSI port and holds one or two floppy drives, in any mix of 3½-inch and 5¼-inch formats. You can outfit a DaynaFile to read and write 720K or 1.4MB 3½-inch disks, and 360K or 1.2MB 5¼-inch disks (the higher-capacity drives can access lower-capacity disks, but not always reliably). Combine DaynaFile's complete media support with the ability to work with MS-DOS disks directly on the desktop and you have the most versatile disk drive-based transfer product available.

And the most expensive. A DaynaFile with one 1.4MB, 3½-inch drive and one 1.2MB, 5¼-inch drive costs \$1105. You can buy an economical PC clone for less and transfer files using a cable. But many people prefer the simplicity of working with DOS disks within the Mac's friendly confines. For them, DaynaFile is ideal.

I learned the hard way that the latest DaynaFiles (units with version 3.1 ROM chips) aren't compatible with Bering's Totem drives, cousins to the Bernoulli Box. To use a DaynaFile with a Totem drive, you need version 2.1 of the DaynaFile ROM. But Dayna says that version doesn't work properly with many SCSI devices, so your best bet is to use a different hard disk or a Bernoulli Box II.

**Bernoulli Box II** If your Macs and PCs have Bernoulli Box II drives, you can transfer roughly 30MB of data at a time using Iomega's Bernoulli File Exchange. A specialized version of Dayna's DOS Mounter, Bernoulli File Exchange lets you work with PC cartridges on the desktop—in theory. The program comes with a Read Me file filled with dire warnings: don't use the program unless you've backed up first; don't leave it in the System Folder unless you're going to transfer files; and restart the Mac every 30 minutes



to avoid problems. These caveats don't inspire confidence, and confidence is important when you're working with cartridges that hold 44MB.

In my testing, I encountered only one problem, but it's a big one: the Mac wouldn't recognize the PC cartridges. It turns out you need to divvy up a 44MB MS-DOS Bernoulli cartridge into smaller partitions for Bernoulli File Exchange to work—a point not mentioned in the manual or the Read Me file. There are many good reasons to buy a Bernoulli Box, but Bernoulli File Exchange isn't one of them.

**Recommendations** If you already have a SuperDrive-equipped Mac, use Apple File Exchange for occasional transfers, or combine it with Dayna's DOS Mounter for more convenient access to DOS disks. If you don't have a SuperDrive, the combination of a Drive 2.4 and Rapport is a better buy. (You might also consider Peripheral Land's SCSI-based TurboFloppy, which was not available for review.)

For reading 5¼-inch DOS disks, DaynaFile is the best choice. (Apple sells a 5¼-inch drive, but it's expensive, requires an expansion board to run, and doesn't show disks on the desktop.) If you use Bernoulli Box II drives on your Macs and PCs, consider Bernoulli File Exchange—but heed its warnings.

Finally, it's worth noting that you can equip a PC to read and write Macintosh disks using Central Point Software's Deluxe Option Board, which works with a PC's existing 3½-inch drive, or Micro Solutions' MatchMaker, which lets you attach an external Mac drive to a PC.

### Cable-Transfer Products

Sometimes the shortest distance between two machines is a cable. Perhaps you don't feel like shuffling floppies, or you need to transfer more data than will fit on one disk. Maybe you don't want to spend several hundred dollars on a specialized disk drive; perhaps you need more file-translation features than disk-transfer products provide. Whatever the reason, there's a cable-transfer product that's right for you (see "Cable-Transfer Tools").

**LapLink Mac Release III** The latest version of Traveling Software's popular file-exchange package offers

more transfer options than a metropolitan bus schedule. You can swap files between Macs at blazing speed using a SCSI cable, or at a more moderate pace using LocalTalk. (Alas, you can't use LocalTalk to transfer files to PCs.) You can also swap files via modem, and you can assign passwords on several levels to prevent access to your machine or to certain folders.

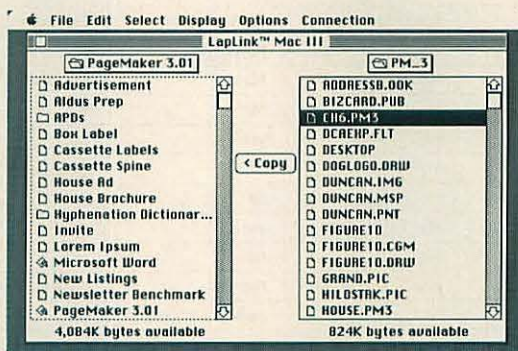
LapLink Mac includes a serial cable and software for the Mac and PC. Normally, you transfer files by running the LapLink software on both machines (see "Link Alikes"). A LapLink Mac INIT for the Mac also lets you conduct transfers from the PC without having to launch the Mac application. You can use the Mac for other tasks while background transfers take place, but the machine does slow down and the mouse pointer moves erratically.

LapLink Mac can translate several types of word processor files, but it doesn't handle graphics translation. For that, you'll need a graphics-translation utility such as the PC-based Xport from Micrografx, The Graphics Link Plus+ from HSC, or the Mac-based CadMover from Kandu Software. DataViz's MacLinkPlus/PC offers limited graphics-translation features. So-

lutions' The Curator graphics-management utility can translate between several Mac and PC graphics formats.

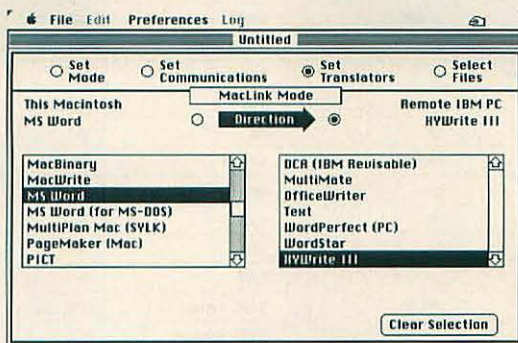
LapLink Mac includes extension maps for most popular dual-platform programs. If the type of file you're transferring doesn't have an entry in the extension map—or if its extension has more than one entry, as is the case with commonly used extensions such as .DOC—a dialog box appears that lets you cancel the transfer, select a file type manually, or add an entry to the extension map. It's a nice touch that minimizes the risk of a file obtaining the wrong extension or signature.

Other thoughtful touches abound. The Mac and PC software share similar user interfaces, so switching between them is easy and comfortable. You can search for files on either the local or the remote machine. You can select files for transfer based on names and creation or modification dates. And the PC software includes a program information file (PIF) that lets LapLink Mac run under Microsoft Windows—sensible, since many PC users who swap files with Macs use Windows programs such as PageMaker and Excel.



### Link Alikes

The Mac and PC transfer software from Traveling Software's LapLink Mac Release III use a similar interface design and commands, making it easy to move between the two and allowing you to initiate transfers from either machine. The PC software supports a mouse and can run under the Microsoft Windows environment.



### MacLink Transfers

To translate files using DataViz's MacLinkPlus/PC, you first click on a file format in one scroll box; the other scroll box then lists only the available file formats. Here, MacLinkPlus/PC is translating a Word document into HyWrite III format. After choosing translators, you click on the Select Files button to select the files to be moved.



**MacLinkPlus/PC** DataViz's MacLinkPlus/PC is the latest version of a product that dates back several years. MacLink's basic design hasn't changed—you control all transfers from the Mac. The somewhat crude PC software lets you simply adjust communications settings and specify an optional password. The Mac software is generally easy to use, but it doesn't feel as polished as the latest LapLink Mac.

MacLinkPlus/PC has the edge in file translation and extension mapping, however. Indeed, you can't select files to transfer without first specifying how (or whether) they should be translated (see "MacLink Transfers"). This multi-step process helps prevent translation errors, but it slows you down when you want to move files that don't require translation.

MacLinkPlus/PC also includes MacLinkPlus/Translators, the most exten-

sive set of translators available for Apple File Exchange. Claris's MacWrite II version 1.1 can use these translators to directly read and write a raft of PC word processor formats, including WordPerfect, MultiMate, WordStar, XyWrite, OfficeWriter, and Microsoft Word. Thanks to a new file-translation technology developed by Claris called XTND, installation is as easy as copying the translators and a driver file called MacLinkPlus/Bridge to a MacWrite II folder. If you use MacWrite II, this feature alone makes MacLinkPlus/PC worth acquiring. You can also purchase MacLinkPlus Translators separately; consider that option if you already have a way to access the other camp's files.

Versions of MacLinkPlus are also available with translators for Wang and NBI word processors as well as Sun workstations and the Next computer. The DaynaFile drive and TOPS net-

work software also include versions of MacLinkPlus.

MacLinkPlus/PC's graphics-translation features are rudimentary. The program performs extension mapping when you transfer EPS or TIFF files. It also translates PICT files into PC Paintbrush files and vice versa, although that's a less-than-ideal translation scheme. If you translate an object-oriented PICT image into bitmapped PC Paintbrush format, you lose the advantages of resolution independence that PICT provides. If you need to move PICT images to the PC, a better translation tool is the PC-based Xport from Micrografx, which can translate PICT images into a variety of object-oriented PC formats.

**xFer** Messenger Software's xFer has a few unique strengths: it lets you transfer entire Mac folders or PC subdirectories in one fell swoop, and you can move entire PC subdirectories to

## CABLE-TRANSFER TOOLS

	MacChuck	pcMacTerm	LapLink Mac III	MacLinkPlus/PC	xFer
Vendor	Vano Associates	Dynamic Microprocessor Associates	Traveling Software	DataViz	Messenger Software
Machine used for transfer control	Mac or PC	Mac	Mac or PC	Mac	Mac
Supports Mac-to-Mac transfers	no	no	yes	yes	no
Runs PC programs remotely	yes	yes	no	no	no
Maximum serial-transmission rate (in bps)	57,600	57,600	115,200	57,600	57,600
Allows background transfers	no	no	yes	no	no
Transfers entire folders or subdirectories	yes	yes	no	yes	yes
Logs transfer activity	no	no	yes	yes	no
Supports LocalTalk connections	yes	network	between Macs	no	no
Supports modem connections	no	serial	yes	yes	yes
Supports SCSI connections	no	no	between Macs	no	no
Connection cable	yes	no	yes	yes	optional
Translates graphics file formats	limited	limited	no	optional	no
Translates text file formats	limited	limited	optional	optional	limited
Translates spreadsheet/database formats	limited	limited	optional	optional	yes
Customizable character translation w/in files	no	no	no	no	yes
Strips line feeds from text-only files	yes	yes	optional	optional	optional
Maps file extensions	no	no	yes	yes	yes
Customizable extension maps	limited	limited	yes	no	yes
Creates folders or subdirectories	yes	yes	yes	no	yes
Deletes files	yes	yes	yes	no	yes
Password protection	no	yes	optional	optional	yes
Access privilege levels <sup>1</sup>	NA	R/W	R/W, R/O, PF	R/W	R/W
List price	\$99.95	\$195, serial \$395, network	\$189.95	\$199 \$169, translators only	\$ 99.95 w/o cable \$129.95 w/cable

<sup>1</sup> R/W = read/write; R/O = read only; PF = published folders only.



other DOS directories. It also lets you use the Macintosh as a hard disk backup device for the PC, or vice versa; when you update the backup, xFer transfers only new or altered files. As with MacLinkPlus, you control xFer from the Mac.

xFer's most impressive feature lets you create a search-and-replace table for translating characters while a file is being transferred. You can use this feature for simple tasks, such as turning each occurrence of double hyphens (--) into an em dash (—). Or, you could tell xFer to change each occurrence of the string <R> into a register mark (®), a character that is not available on the PC. xFer also includes ambitious tables that convert between ASCII text and EBCDIC, a character-encoding scheme used by many large computer and word processing systems.

I wouldn't use xFer as my only file-transfer utility—it isn't as easy to use as LapLink Mac or MacLinkPlus; its file format translation features are spartan. And its manual, while complete and detailed, is too technical for inexperienced users and assumes too much knowledge of the PC. But xFer's unique and powerful backup and search-and-replace features make it an ideal complement to other products.

**QuickShare** Compatible Systems Corporation's QuickShare takes a unique approach to file swapping. It's a hardware-software combination that includes a SCSI expansion board for a PC, XT, or AT (sorry, no IBM PS/2's), and software that lets you transfer files via a SCSI cable. A PC's hard disk appears as an icon on the Mac desktop, allowing you to copy files using the Finder.

QuickShare's PC Transfer utility is a Mac program that lets you zap files between machines without translating them. Another utility, Print Capture, transfers formatted files or bitmapped graphics by accepting the data a PC application would normally send to an IBM Graphics Printer (which is supported by virtually all PC programs). Print Capture then creates a formatted MacWrite or MacPaint document containing the file's contents. This clever approach lets you transfer formatted text from any application that supports the IBM Graphics Printer.

You can also transfer graphics, but they arrive in bitmapped form, so you wouldn't want to use QuickShare to transfer CAD or other object-oriented images.

**pcMacTerm, MacChuck, SoftPC** These aren't file-transfer utilities as such. Dynamic Microprocessor Associates' pcMacTerm and Vano Associates' MacChuck PC Remote Control Program both let you control a PC using the Mac. You can run programs, manage disks, and print to a Mac printer from PC applications—all while viewing the results on the Mac's screen.

The remarkable SoftPC, from Insignia Solutions, also gives you a PC in a window, but you don't have to buy a PC. SoftPC allows 2MB Mac IIs or SE/30s to run PC software—using no additional hardware, SoftPC emulates an IBM PC/XT equipped with 640K of memory, Microsoft Mouse, and Color Graphics Adaptor (see *Reviews, Macworld*, September 1989). The \$199 SoftPC AT software module upgrades soft hardware to mimic the faster IBM PC/AT (with expanded memory and 80287 math coprocessor) and the sharper Enhanced Graphics Adaptor. It even runs Windows applications such as PageMaker.

From the file-transfer perspective, all three programs have some appeal. pcMacTerm displays bitmapped PC graphics on the Mac's screen and lets you copy them to the Clipboard. You can use this technique to capture PC graphics you might not otherwise be able to transfer. Both MacChuck and pcMacTerm let you copy text from a PC program to the Clipboard. You might use SoftPC to return to the application that originally created a document to make changes before translating it into a Mac format.

All three programs let you change the type and creator codes given to PC files you transfer to the Mac. pcMacTerm and MacChuck also strip the unneeded line-feed codes from text-only files. Beyond that, none of the three perform any translation or extension mapping.

#### Recommendations

For versatility and ease of use, you can't beat LapLink Mac Release III—provided you don't need extensive file-translation features. If you do, Mac-

LinkPlus/PC is a better choice. Its Apple File Exchange translators and their ties to MacWrite II are especially appealing. Try QuickShare if you use PC programs that can't save files in a format supported by your Mac programs or translation utilities.

#### Transfer Tips

Don't neglect the file-translation utilities you already have: your applications. Most programs read and write several file formats, and by matching up formats, you may be able to transfer formatted files without using a translation utility as an intermediary. For example, Microsoft Word 4.0 can write RTF files, which Microsoft's Word for Windows can read.

What's ahead for file-swappers? Less work. The DOS-on-the-desktop approach offered by network software and the DOS Mounter-SuperDrive combination is already making it easier to access PC files. The next step is transparent translation—the kind MacWrite II 1.1 provides when teamed with DataViz's translators. Last January, DataViz and On Technology signed an agreement to include the MacLinkPlus/Bridge with On Technology's On Location file-searching and text-retrieval utility. This will enable formatted documents from PC word processors to appear in On Location's view window. If other developers adopt DataViz's translator bridge and the Claris XTND file-translation technology with which it works, we can look forward to a day when translation occurs behind the scenes regardless of which program you use.

In the meantime, if you swap files regularly, try to standardize on programs that can read each other's formats. You'll minimize translation hassles, and you'll be able to concentrate on working with your files—which is why you transferred them in the first place. ■

See *Where to Buy* for contact information.

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*Jim Heid is a Macworld contributing editor and Getting Started columnist. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh, an advanced-user's guide to the Mac, published by Brady Books (1989).*



# Making Plans

**A  
buying  
guide for 2-D  
mechanical  
and  
architectural  
CAD**

**I**n the last two years, a bewildering flurry of Macintosh CAD (computer-aided design or drafting, depending on whom you talk to) packages have hit the market. For CAD novices, the critical question about this software is, Which program is the best for my particular situation? The wide variety of features and price levels makes it likely that somewhere there is a package that meets all or most of your needs.

For experienced CAD users, the plethora of products opens up new options. Can you use the Mac version of your minicomputer CAD package to get twice the design seats for the money? Can you give the die-hard Macaholics in your organization the Macintosh version of your current PC package? Are the new features that an upgrade, or even a new package, can deliver worth the expense and the effort of retraining?

Different users have different needs; this article focuses on the two largest groups of CAD users, mechanical designers and architects. CAD comes in two basic flavors. There is the 2-D, drafting-board style, where the screen on the computer is used as if it were a

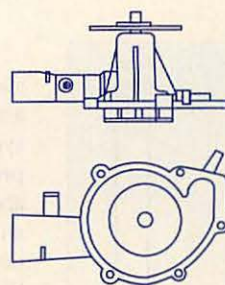
sheet of paper; and there is true 3-D modeling, where the screen on the computer becomes a space in which to sculpt. This article concentrates on two-dimensional designing, including technical illustration. Though several of the packages listed in "The World of 2-D CAD" have 3-D capabilities, 2-D design is used exclusively for most simple projects and is frequently a prelude to 3-D analysis. Several specialty CAD products are available for niche applications. "Special-Purpose CAD" describes a few such programs.

## **Using Mechanical CAD**

Mechanical engineers design products. Certain features, usually requirements of the manufacturing process, are common to mechanical designs. These characteristics allow parts to be machined, welded, or stamped, and assembled without damage. The ability to easily and conveniently represent features such as chamfers of a specified depth and radius, radii, fillets, and draft will make a CAD program more or less satisfactory for use by mechanical designers (see "Not Quite Finished").

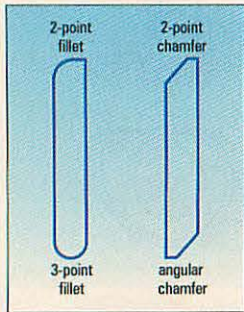
**by Doug Houseman  
and Ann Marie O'Connell**



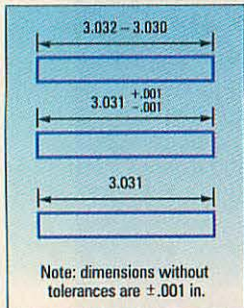


LUIS DELGADO





**Not Quite Finished**  
Not all programs can draw these simple yet essential material finish types; some require users to edit their drawings manually.



**What's Your Tolerance?**  
Different CAD users require different dimensioning styles. Be sure the program you buy offers the convention you use.

Mechanical CAD systems represent features such as gear teeth and threaded holes either with actual drawings of the details or with one or more symbol conventions. A dimension may be expressed as a single value, with an overall allowable tolerance called out in a note; as a range within which the dimension must fall; or as a target value with allowable variances (see "What's Your Tolerance?"). The ability to select either ANSI 14.Y or ISO dimensioning systems is a useful feature of some 2-D packages (see "The World of 2-D CAD"). If you are choosing a CAD package for an organization, make sure that the package you buy supports the standard representation and dimensioning methods your company uses.

Since neither nature nor products are composed solely of straight lines, the mechanical designer must be able to accurately represent lines that are smooth but not straight. Curves are represented in CAD programs by mathematical constructions known as splines and bezier curves. The mathematics of representing curves can become very complex, and most designers simply use whatever representation is available, without worrying about the details of the equations. But if you do need to specify every point along a line or surface, be sure to buy a package that represents equations in a way that's compatible with your work.

Translation of CAD files from mainframes, minicomputers, and MS-DOS machines is critical to engineers in large organizations. Autodesk created the DXF format to allow other programs to read and use AutoCAD files. DXF-compatible software has the largest installed base of all formats, with the preponderance running on DOS PCs. The popularity of DOS machines as CAD workstations has caused the PC market tail to wag the large computer market dog, prompting a number of mainframe and minicomputer programs to adopt the DXF format as well.

### Using Architectural CAD

Architectural CAD is very different from mechanical design. Neither the ANSI 14.Y nor the DXF capabilities are as important to an architect as to a mechanical designer. Architects often block out 10 or 12 ideas before they decide on a path. Architects, therefore, need to be able to modify drawings rapidly and maintain a history of changes. Architects also use many more industry-standard symbols than do mechanical designers, so symbol libraries are important.

Buildings are composed of multiple systems; in addition to the structure itself, common systems include electrical, HVAC, and plumbing. The most convenient way to represent these systems is to put each one on a separate layer of a drawing. In large firms, different people may be responsible for different systems; to check fit and

connections, the layers can be displayed together.

For architecture, double-line drawing is not just a nice-to-have feature. Architectural packages need double-line drawing capability to represent walls. Not all double-line drawing setups are created equal. Being forced to align the inside and the outside of every wall manually is a slow and painstaking process. The best programs enable you to specify such things as wall and line thickness; whether the wall will snap to the center line, inside wall, or outside wall; and whether the two lines will be one or two objects. Some of the programs allow the user to specify automatically how an intersection should be trimmed and where the walls are to be placed (see "Info on Intersections"). Architrion II—with its automatic intersection, width, and offset controls—offers the best double-line handling of the programs we looked at.

### Interface Issues

Much of the Macintosh's popularity is based on the standardization of the user interface. Most Mac programs use similar commands to perform similar functions. Because drafting is a specialized task that requires a large number of complex tools, however, features not standard for the Mac are common in CAD. Typically, programs that completely follow the MacDraw conventions lack the power to complete a real project. On the other hand, a program that is primarily command-line driven is very hard to learn and can decrease, rather than enhance, productivity.

The earliest CAD packages for the Macintosh were built on the Mac for the Mac. Since then, several mainframe and MS-DOS CAD vendors have ported their products to the Macintosh. The best implemented imports seem to embody an attitude that says, "How much can I do with the Macintosh interface?" The designers of the worst ports seem to have asked, "How little of the Macintosh interface can I get away with and still get this program running?" For ease of use and conformance to the Mac interface, the best port is MacBravo, with VersaCAD a very close second. The most un-Mac-like port we reviewed is InCAD, with AutoCAD close behind (or is that ahead?). Of recent programs designed specifically for the Mac, Ashlar Vellum has done the best job of using a pure Macintosh interface to deliver a lot of power.

When evaluating interfaces, here are a few points to consider. The tool palettes need to be large enough to let you achieve your intended choice without having to repeatedly re-aim the mouse. Several of the packages we tested have small icons that get lost on a big screen. The worst offenders are InCAD and Snap. Granted, large icons and palettes cost you valuable drawing area on a Mac Plus. With the prevalence of large and multiple monitors at CAD workstations,



however, it's odd that none of the packages under review offer resizable tool palettes.

Menus should have a logical structure and be extensible. With enough experience on a system, users can develop strategies to overcome poorly organized menus, but doing so is a strain. MiniCAD, MacBravo, and AutoCAD all offer ways to change and extend their menus, though AutoCAD only allows additions to its on-screen selection (MS-DOS style) menus. (All of these CAD programs would benefit from a menu-rearrangement utility like the one in Microsoft Word 4.0.)

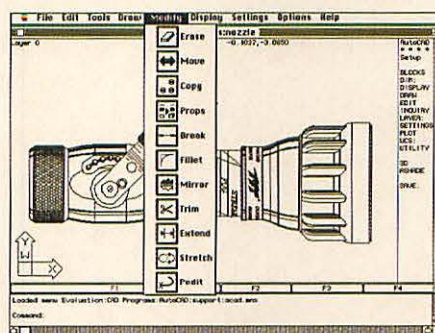
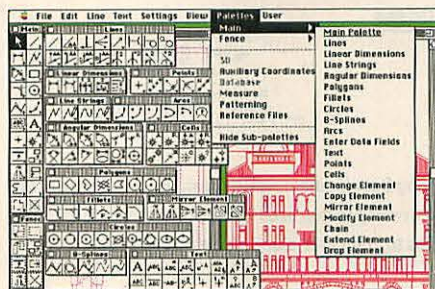
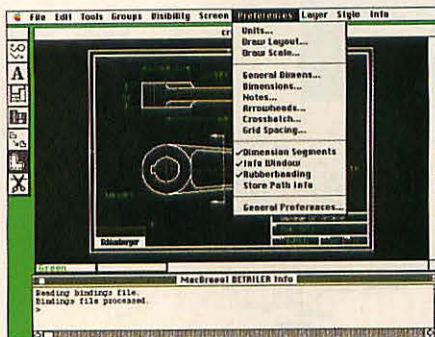
Command windows, though they hark back to the days of the MS-DOS interface, can be extremely useful if integrated properly into a program. As you create items in a drawing, a command window echoes in words whatever you do. This is handy for several reasons. First, it lets you quickly scroll back and see if reverting to the last saved version of a drawing will save more time than individually removing unwanted items. Second, you can scroll back and select a group of actions to embody in a macro. Command windows also let you input values for height, width, or position of an object quickly and accurately. MacBravo and VersaCAD do the best job of integrating a command window with menus. And AutoCAD is an example of how command windows can replace the mouse and menus, defeating the idea behind a graphic interface.

## Macro Languages

As you gain familiarity with a package, its limitations may become more apparent. Macro languages permit you to automate repetitious tasks and to overcome the limitations you will eventually find in any CAD package. Because of its powerful, object-oriented macro language—AutoLisp—AutoCAD has been used as the basis for many vertical-market software products. As usual in computer applications, with power comes complexity; AutoLisp is not for anyone afraid of a steep learning curve.

MiniCad's macro language stakes out a middle ground between power and complexity. MiniPascal is easy to learn, very efficient, and powerful enough to create macros that can generate airplane wing sections from a few numeric inputs, for example. Snap has an easy-to-use macro language that creates a panel of buttons on the screen. For pure usability, Snap's Key-ins language is wonderful.

MacBravo offers both a macro language and a "follow-me" macro-creation routine called MouseStrokes. To use MouseStrokes, you tell the computer to record the mouse and keystroke combinations you make. You can also do this retroactively, from the history in the command window. Each time you execute the routine, the computer repeats the original set of commands.



## Bravo!

The MacBravo interface is Mac-like yet includes some very sensible extensions. Every operation you perform is recorded in script in the command line. To repeat an operation or create a macro, simply cut and paste the relevant chunk of script.

## Intergraph Interface

Intergraph takes the Mac interface a bit around the bend. Shown here are only a few of the program's available palettes.

## For AutoCAD Fans Only

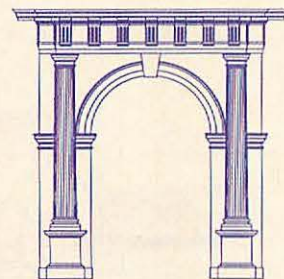
The AutoCAD interface has no floating menus or palettes, and no support for the Clipboard or Scrapbook, and all operations require some typed commands. This shows how the command window can be used to replace, rather than enhance, the visual interface.

Vellum takes a completely different tack by providing Drawing Assistant, an online expert that provides guidance on drafting methodology and program operation. Usually, these suggestions are helpful, but if you're trying to do something other than what Drawing Assistant assumes, the program's kibitzing can be intrusive. Drawing Assistant makes Vellum the best CAD teaching tool so far developed, but Vellum currently lacks the ability to be extended through macros or add-ins.

## Symbol Libraries

Whether it's engineering's nuts and bolts or architecture's sinks and windows, most designers use the same parts over and over. One of the main reasons CAD was first developed was to take advantage of the reusability of graphic objects. While the Mac's Scrapbook can be used to hold small sets of symbols, true symbol libraries are a key part of CAD software.

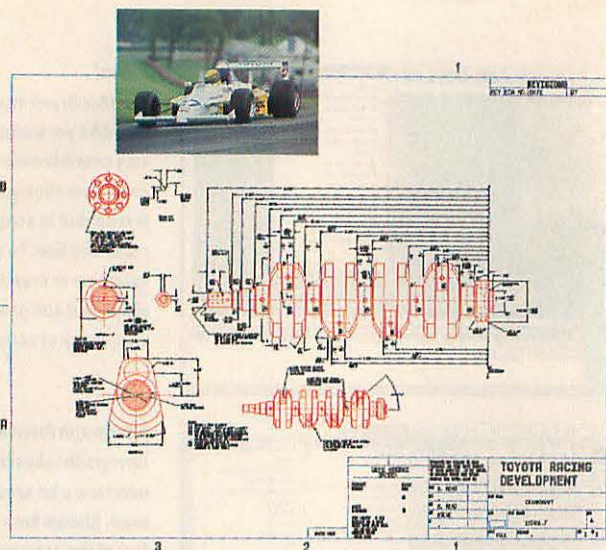
There are two good ways to get a symbol library: build one or buy one. When you're creating library symbols, some programs force you to use a special mode. If you're in the middle of a drawing, quitting to enter the symbol-creation mode interrupts your work flow. In most cases, you can use the Clipboard to get around this requirement, drafting a symbol and then copying it



## Easy Arch

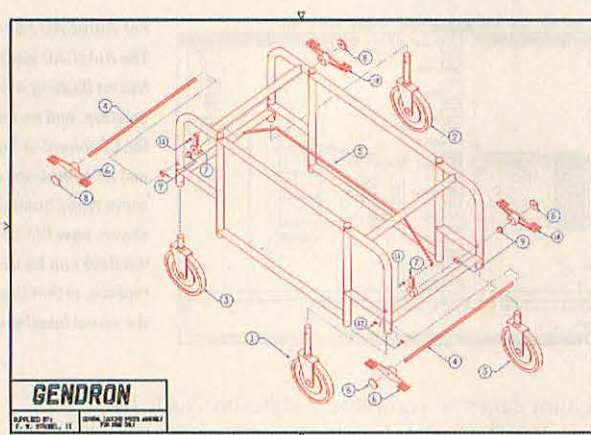
A technical illustration made in Generic Software's CADD Level 1.





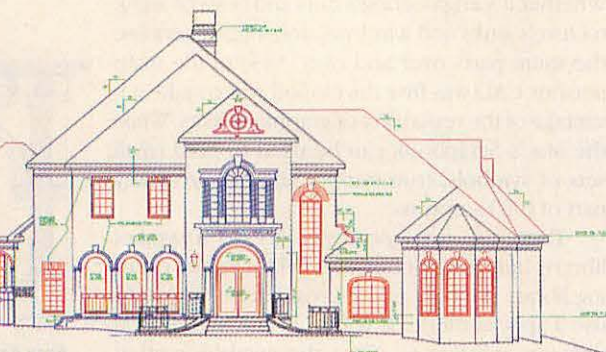
### Built for Speed

Engineers at Toyota Racing Development, which designs cars for one of the most successful teams in racing today, used MacBravo Detailer to take this crankshaft from sketches to computer-aided manufacturing in six months.



### Fish out of Water

An engineer at the Gendron Company drew this isometric assembly drawing in MacBravo Detailer. The company makes specialized conveyance devices; this model is for dolphins at the San Diego Zoo.



### From Design to Drafting

Richard Reed designed his Knoxville, Tennessee, house in Architron's 3-D mode. He used the 2-D module to produce the working drawings.

into the library-creation mode. The exception is AutoCAD, which not only forces you to follow an extremely inflexible symbol-creation process, but doesn't support the Clipboard.

There are more than 200 symbol packages that can be either used directly or converted with CADMover to be compatible with your CAD package. Whether your library is self-created or store-bought, you should be able to easily access and edit library objects and control the scale at which they are placed in a drawing.

Libraries can be either bound to a drawing or contained in stand-alone files. When libraries are bound to a drawing, each symbol used is stored in a library file specifically for that drawing. To reuse the symbol in another drawing, you must copy the symbol into the library of the second drawing. With stand-alone libraries, a number of drawings can make reference to the same library. Symbols added to the library from one drawing are directly available in all drawings. The stand-alone library is by far the most useful and is also most efficient in terms of disk storage (see "The World of 2-D CAD").

We were surprised to find that, of the programs we looked at, Design Your Own Home Architecture—one of the least expensive—provides the best access to libraries. This package features on-screen representation of library symbols instead of a name or a symbol number, ease of creation, and automatic scaling.

Hot linking libraries to the drawings in which the symbols are used is the standard procedure in minicomputer- and mainframe-based CAD. When a library has hot links, changes made to library symbols are automatically reflected in drawings every time you open the drawing or call it up for printing. This technique can save you endless effort updating old drawings.

Hot-linked libraries have one drawback, however: you must have the discipline to change symbols only when you want the change to be universal. If you change a library object because it is quicker than creating a new one, you will change all of your other drawings. Some Mac programs offer warm links, which are safer to use than hot links because the user can specify that changes be operable only in a given drawing.

Counting all the desks and chairs in a typical office building and listing them by type and location is not an easy task. Several of the packages we reviewed will count the number of times a symbol from a library has been used in a drawing. In a few you can designate both library and non-library objects that you would like tabulated.

No currently shipping CAD package for the Macintosh creates a complete, costed bill of materials. Architron II does the best job of creating a bill of required details: sinks and toilets, or screws and washers. This is an area that requires



improvement if Macintosh CAD is going to become a true productivity tool for design organizations.

Oddly, given the object-oriented focus of the Macintosh, support for symbol libraries is the weakest aspect of Macintosh CAD today. As currently implemented, hot links work only with first-generation copies of symbols; if you paste a symbol in two places without going to the original, the second copy is not linked. None of the packages listed here allow you to append comments or text to symbols in the library or include symbol-change histories.

### Input and Output

Since most of the MS-DOS programs either use or can export DXF format files, moving data from an MS-DOS CAD program to the Mac is fairly easy. You can copy the files across a modem or network connection, use Apple File Exchange and a SuperDrive, or copy files to and from a tape format supported in both DOS and Mac machines. Moving workstation and mainframe files onto the Mac can be a bit trickier because they have fewer media formats in common, but utilities exist to make that job fairly simple.

Until the advent of CadMover, from Kandu Software, moving CAD files between Macintosh CAD programs was one of the hardest things to do. Most of the early CAD packages each had a unique file format or unique extensions to PICT, which meant that some data was lost in almost every move. CadMover offers data interchange among all of the Mac-specific formats, DXF, and IGES in a single package. In most cases, you have complete control over both the input and the output format of the file.

Once you have a CAD file in the format your drafting software requires, you will need to put it on paper (or film). There are two major types of CAD output devices: printers and plotters. Laser printers are used to output technical illustrations, small drawings, or sketches. Pin printers are still used by a number of people, but their use is fading as larger format laser printers and better plotter drivers are released. Plotters are typically used to obtain color output or large drawings. All of the packages in "The World of 2-D CAD" have some ability to work with a laser printer. The table lists programs that have plotter compatibility. The number of plotters supported and the ease of setup varies widely among packages. Be sure support for your plotter is available in your chosen CAD program before you buy.

### Recommendations

In preparing this article we ran comparisons of the software on a Macintosh II equipped with an Apple 13-inch monitor, a SuperMac 19-inch monitor, 8 megabytes of memory, System 6.0.3, and a

200MB hard disk. We also tested the software for compatibility with AppleShare 2.0.1 and TOPS 2.1. For serious CAD work, two or more monitors are extremely useful. Two monitors working in tandem give you room to display multiple views of the same file and to group the tool palettes.

We created a gear set and its housing to test the mechanical-design programs. Though both items are fairly simple, they used most of the packages' features. With the architectural packages we created plans for an addition to a house—with a sun space and hot tub—and the mechanicals to go with them. Based on our testing we make the following recommendations.

For technical illustration, Dreams is our choice. It's easy to use and has the features tech-

## SPECIAL-PURPOSE CAD

**S**pecialized CAD on the Mac got its start with **MacSurf**. This package, developed in Australia, was used to create the last two America's Cup winning yachts. It has become the standard package used for boat design worldwide.

**ModaCAD** is an innovative program that enables users to create clothing patterns. The patterns can then be exported directly to computerized cutting machines or printed on a plotter.

MacBravo's **Facilities Manager** package should hit the market this summer. If it does, it will be the first commercial building-construction and -design package. This package will count tables and chairs, fly you through models, and track many of the OSHA requirements that designers of commercial structures must meet on a daily basis.

Creation of multilayer circuit boards is handled efficiently by **Douglas CAD/CAM Professional System** and a number of other emerging Macintosh packages. The Douglas package is unique in that it can receive design files via modem and create complete prototype boards quickly.

**Irrigation Design** is one of the many AutoCAD-based packages that are now becoming available for the Mac. The designer has complete control of the placement and sizing of an irrigation system for a field or a yard.

**Cosmos/M** is an add-in for any CAD package that exports IGES or DXF files. A finite-element-analysis package that displays stress levels in color on the screen, Cosmos/M permits interactive changes to models.

**Landesign** is used to create survey maps and road-construction blueprints. Developed in Canada, Landesign has a very comfortable interface and offers a good deal of flexibility to the cartographer or road designer.

nical illustrators need. It lacks many of the advanced features of a true CAD program but exceeds the drawing programs available on the Mac when it comes to accuracy and item placement.

For playing around or simple experimenting with CAD, Snap is a good choice. It is affordable and offers a wide range of features. Working with Snap will let you determine the range of features that you regularly use or would want to use when drawing; you can get a more powerful or special-



# THE WORLD OF 2-D CAD

Product	Archittrion II	Ashlar Vellum	AutoCAD	Blueprint	CADD Level 1	Claris CAD	Own Home Architecture	Dreams	FlexiCAD
Version evaluated	Series 5	1	10 vc5	1.0v6	1	1.1.1	1	1.1	1.2
Company	Gimeor	Ashlar	Autodesk	Graphsoft	Generic Software	Claris Corporation	Abracadata	Innovative Data Design	Amiable Technologies
Price	\$3400	\$995	\$3000	\$295	\$149	\$799	\$99.95	\$500	\$1495
Copy protection	yes	no	no	no	no	no	no	no	yes
Online help	minimal	no	yes	no	yes	no	no	yes	no
Minimum Macintosh/ minimum RAM	II/4MB	II/4MB	II/4MB	SE/1MB	SE/1MB	SE/1MB	SE/1MB	SE/1MB	II/4MB
Supports 3-D	yes	yes	yes	no	no	no	no	no	no
Application best suited to	architectural	mechanical	mechanical	mechanical	illustration	mechanical	architectural	illustration	mechanical
TOPS/AppleShare	no/no	yes/yes	no/yes	yes/yes	no/yes	yes/yes	no/yes	no/yes	no/no
Number of colors/layers	256/256	256/8	256/250	256/∞	2/256	256/64	2/2	16.7M/64	8/∞
Standard Mac fonts	no	yes	no	yes	no	yes	yes	yes	no
Automatic separate lettering layer	no	no	no	no	no	no	no	yes	no
Import and export (IGES/DXF)	no/yes	no/yes	partial/yes	no/yes	no/no	partial/partial	no/no	no/no	yes/yes
Import and export (PICT/PostScript)	yes/no	yes/no	no/no	yes/yes	yes/yes	yes/no	yes/no	yes/yes	yes/partial
Plotter support	yes	yes	yes	partial	no	yes	no	yes	yes
Accuracy (digits)	16	16	12	12	16	16	4	4	16
Views open at once	1	1	1	1	1	1	1	1	4
Levels of zoom (in/out) (powers of 2)	32/32	∞/∞	∞/∞	∞/∞	∞/∞	32/32	0/0	32/32	∞/∞
Pan	yes	yes	yes	no	yes	no	no	no	yes
<b>TOOLS</b>									
Bezier/spline	no/no	yes/yes	yes	yes	yes/yes	no/yes	no/no	yes/yes	yes/yes
Trim	no	yes	yes	yes	no	yes	yes	yes	yes
Fillet/chamfer	yes/yes	yes/yes	yes/yes	no/no	no/no	yes/yes	no/no	yes/no	yes/yes
Segment	yes	yes	yes	yes	yes	yes	yes	no	yes
Fence	yes	yes	no	no	no	no	yes	no	yes
Mirror	yes	yes	yes	yes	yes	yes	no	no	yes
Duplication (radial/polar)	yes	yes	yes	yes	no	yes	no	no	no
Double line	yes	partial	yes	yes	no	yes	yes	no	yes
<b>CALCULATIONS</b>									
Area	yes	yes	yes	no	yes	yes	yes	yes	yes
Perimeter	yes	yes	yes	no	no	yes	no	no	yes
Centroid	yes	yes	no	no	no	no	no	no	no
Moment of inertia	no	yes	no	no	no	no	no	no	no
Macro language									
Programming language	no	no	yes	no	no	no	no	no	yes
Edit on the fly	no	no	yes	no	no	no	no	no	yes
<b>DIMENSIONING</b>									
Inside/diametric	yes/yes	yes/yes	yes/yes	yes/yes	no/no	yes/yes	yes/yes	yes/yes	yes/yes
Radial/angular	yes/yes	yes/yes	yes/yes	yes/yes	no/no	yes/yes	no/yes	no/no	yes/yes
Automatic updates	yes	yes	yes	yes	no	yes	yes	yes	yes
Keyboard dimensioning	yes	yes	yes	yes	yes	partial	no	no	yes
<b>LIBRARY AND SYMBOLS</b>									
Self-created	yes	yes	yes	yes	yes	yes	yes	yes	yes
Stand-alone libraries	yes	yes	yes	yes	no	yes	no	no	yes
Updates (hot-link/warm-link)	yes/partial	no/no	no/no	no/no	no/no	no/no	no/no	no/no	no/yes
Tabulation (of symbols/ of duplicates)	yes/yes	no/no	no/no	no/no	no/no	no/no	no/no	no/no	yes/no
Duplicate-object inheritance	no	no	no	no	yes	no	no	no	yes
Editable patterns	yes	yes	yes	yes	no	yes	no	yes	no
Full bill of materials	yes	no	no	no	no	no	no	no	no
Export to databases	yes	no	no	no	no	no	no	no	no

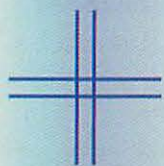


InCAD	MacBravo Detailer	MicroStation Mac	MiniCad +	Origins	PEGASYS II	PowerDraw	Snap	VersaCAD Drafter	VersaCAD/ Macintosh Edition
1.1.1	2.0	3.5	2.0v6	1.01	3.2.3	3.0.1	3.1	2.1.2	2.1.2
Infinite Graphics	Schlumberger	InterGraph Corporation	Graphsoft	Deltasoft	IGC Technology Corporation	Engineered Software	Forthought	Versacad Corporation	Versacad Corporation
\$2495	\$1995	\$3300	\$695	\$595	\$1795	\$795	\$695	\$995	\$1995
no	no	yes	no	no	no	no	no	no	no
yes	yes	partial	no	yes	no	no	no	yes	yes
II/2.5MB	II/5MB	II/4MB	SE/1MB	II/1MB	II/1MB	SE/1MB	SE/1MB	SE/1MB	SE/1MB
yes	yes	yes	yes	yes	yes	no	no	no	yes
mechanical	mechanical	mechanical	mechanical	mechanical	mechanical	mechanical	illustration	mechanical	mechanical
no/no	yes/yes	no/no	yes/yes	no/no	no/partial	no/yes	no/no	no/yes	no/yes
8/8	256/∞	16.7M/1500	256/∞	256/256	16/180	16.7M/∞	256/63	16.7M/250	16.7M/250
yes	no	yes	yes	yes	yes	yes	no	partial	partial
no	no	yes	no	no	no	no	no	no	no
partial/partial	yes/yes	no/yes	no/yes	partial/partial	no/no	no/yes	no/no	no/no	yes/yes
partial/no	yes/no	yes/partial	yes/yes	yes/no	partial/yes	yes/no	yes/yes	yes/yes	yes/yes
yes	yes	yes	partial	partial	yes	yes	yes	yes	yes
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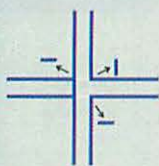
# INFO ON INTERSECTIONS

Architects work continually with double-line intersections. When picking software, be aware that some programs handle intersections more conveniently than others.



## The Starting Point

A double-line tool creates two sets of parallel lines.



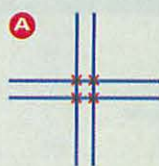
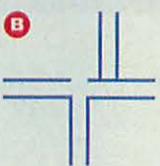
## Manual Trimming

Most programs require you to trim intersections manually. This involves cutting eight joints, and then deleting the four excess line segments.



## The Joy of Joining

Some programs—Blueprint, Architron, MacBravo, and MicroStation Mac—offer a one-step Join command. As with manual trimming, however, the result of this operation is an assemblage of eight separate line segments (A). If you resize a room, for example, repositioning one of the walls, you must go back and manually adjust the intersection (B).



## State of the Art

MicroStation Mac and Blueprint are the only Mac programs to take the final step, adding a special Intersect tool. The software understands intersections marked with this tool as intersections (A); move a wall, and the rest of the intersection readjusts. When the design is set, deleting the intersection markers and extra line segments is a simple task (B).

ized package when you outgrow Snap.

For mechanical design, both Ashlar Vellum and VersaCAD Drafter give good performance at a reasonable price. Both are easy to learn and have a basic set of tools that designers need, along with an interface that is powerful but not intrusive. Ashlar will have to offer a way to turn off Drawing Assistant in the next version, or many users will switch rather than fighting it. For mechanical designers who need the performance of a high-end package, MacBravo has no peer.

For architectural work, Design Your Own Home Architecture is a good way to create quick sketches and samples. It runs on the Mac Portable and Outbound portable, making it useful for on-site work like field corrections or appraisals.

The middle of the price-versus-performance pack for architectural drawing is Blueprint. Though it is only an adequate mechanical package, Blueprint does a very good job of handling double-line intersections, a problem that disqualifies many other programs from serious consideration by architects. The interface is also comfortable to work with.

For the high end of the market in architecture, we like Architron II. However, this part of the market will become hotly contested with several new entries this summer. We stop short of unconditionally recommending Architron II because of its copy protection.

## The State of the Art

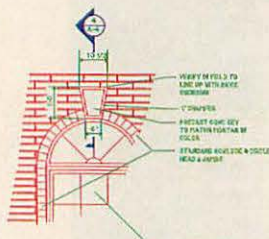
These recommendations are based on the current state of the art. There are many features that the Mac packages lack, and the Macintosh CAD market is still immature. Bill-of-materials support is seriously lacking. No standard file format has emerged to make moving drawings between applications easy. Light pens and other input de-

vices need better support. The CAD packages are faster than their twins on a PC, but the speed that a minicomputer-based package offers is just not available. You cannot toggle lettering and dimensioning on and off at will. Only a few programs automatically place text on a separate layer, so that the drawing can be printed without text for mark-ups or translations. Most packages lack resizable palettes and drawing tool creation.

Few vendors currently support 32-bit QuickDraw; the packages will have to be rewritten for System 7.0. Several CAD packages listed do not run on a IIci. System incompatibility problems will continue into the future unless programmers go back and follow Apple's rules on software.

This is not to say that the current state of the art can't save you time and money. Mac CAD vendors are already closing the gap between Mac and PC programs, and the entry of Intergraph and Schlumberger into the market will accelerate this progress. Most engineers will find that Macintosh CAD is easier to use than its PC cousin and 20 to 40 percent faster. This spells productivity. And because the interfaces are consistent between applications on the Macintosh, engineers and architects will be more productive during the 80 percent of their computer time that studies show they spend on tasks other than CAD. ■

See *Where to Buy* for contact information.



3 WINDOW HEAD DETAIL  
A-4 SCALE 3/4"=1'-0"

A detail from the Architron design on page 176.

.....  
A naval architect by training, **Doug Houseman** has been using CAD systems since 1977. He is also president of the MacTechnics user group.

**Ann Marie O'Connell** is a manufacturing engineer for one of the Big Three auto companies. She has been involved in several major facilities- and equipment-design projects using CAD.

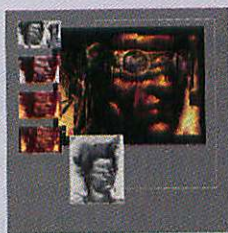


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MACWORLD

Macintosh Masters III

# Art Contest



DARREL ANDERSON

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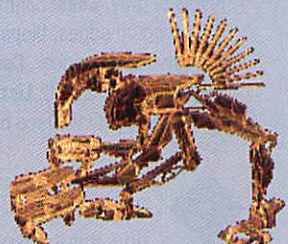
*Macworld* must receive entries by **July 5, 1990.**

## RULES

Please submit no more than four works; each work must be accompanied by an entry form. Include a \$5 (USA) administrative fee with your package (make check or money order payable to *Macworld*). Send hard and disk copies of each piece; disk copies may be omitted if the work will not fit on an 800K floppy. Animated entries may be on disk or half-inch videotape. Work will be returned only if you include postage and packaging. *Macworld* is not responsible for loss or damage. For more information, call 415/978-3176.

Since work will be judged on technical innovation as well as aesthetic value, each piece must be accompanied by a detailed description of how it was produced. *Macworld* and its international affiliates reserve the right to publish entries.

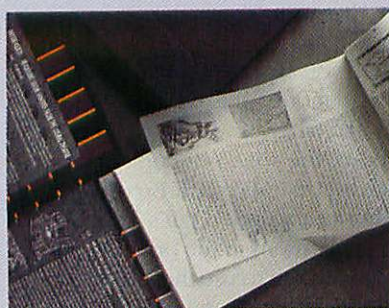
\*Pantone, Inc.'s check-standard trademark for color reproduction and color reproduction materials.



DARREL ANDERSON

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**Entries must be received by July 5, 1990**

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone numbers \_\_\_\_\_

Title of work \_\_\_\_\_

Contest category \_\_\_\_\_

Return postage enclosed ☐ No ☐ Yes \_\_\_\_\_ Amount

Submission format(s)

☐ Disk ☐ Hard copy ☐ VHS video ☐ Beta video

☐ 8mm video ☐ CD ROM ☐ Slide \_\_\_\_\_ Other

Required to view art

Hardware \_\_\_\_\_

Software \_\_\_\_\_





# REVIEWS



## Monitor

### RADIUS PIVOT DISPLAY SYSTEM

**Pros:** Allows you to change the screen's orientation; good software and manuals; excellent brightness; supports up to 16 levels of gray. **Cons:** Slight distortion and blurring on edges; flipping can cause windows to disappear. **Company:** Radius. **Requires:** Mac SE/30. **List price:** Monitor \$995; 2-bit interface board \$695.



Cool. That's the only word that really describes the Radius Pivot Display, a full-page, 72-dots-per-inch monochrome monitor that works in both portrait and landscape modes. Simply grab the Pivot's frame and turn the monitor to a new orientation—the screen blanks out momentarily, then reappears and redraws the desktop. In fact, the Pivot is so cool that every time I made it perform its trick for someone, they'd just gasp and exclaim "Oh, wow!"

After the initial excitement dies down, you'll find yourself flipping the monitor much less often—in part because when you change the monitor's orientation, portions of windows often disappear off the screen unless you remember to resize them before flipping the monitor. In fact, you'll probably only change the orientation when you switch to a project that could greatly benefit from a change in perspective. For instance, you might want to edit a text document in portrait mode in order to get the most lines on the screen, and then flip to landscape mode for page layout. To give you an idea of the difference in what you'll see, an Excel spreadsheet displays 58 rows by 8 columns in portrait mode and 41 rows by 11 columns in landscape.

#### The Details

The Pivot works only with SE/30s and Mac IIs and its 4-gray-level interface board can be upgraded to 16 for an additional \$150. Radius has discontinued its popular, black-and-white Full Page Display monitor, although you can still purchase the Full Page Display's interface board to use with the Pivot monitor. You might want to do this if you are strapped for cash (the Full Page Display interface costs \$200 less than the Pivot interface board) or if you don't ever need to switch from portrait to landscape mode. If you own a Mac Plus or an SE, you have no choice but to buy a Full Page Display interface board since the Pivot interface board isn't available for these Macs.

Yet, Macintosh II and SE/30 owners should not count out the Radius Full Page Display. Text-only workers might never really need landscape orientation. And although the Radius Pivot Display provides excellent brightness and overall good display characteristics, the Zenith-based Pivot Displays I saw were not as sharp as the Full Page Display and also showed some distortion along the edges. Both the lack of sharpness and the distortion were especially apparent when I was viewing text.

Radius took great care in making the Pivot an overall excellent monitor, in spite of some engineering challenges. For instance, monitors draw images by shooting an electron beam across the screen. As the beam sweeps from, say, left to right, the earth's magnetic field tugs the beam out of the alignment found in the center of the monitor. Monitor manufacturers adjust their products to account for the magnetic interference. In the case of the Pivot, Radius had to provide extra shielding to protect the display's geometric proportions when the

monitor is flipped and the magnetic tug changes direction.

#### A Strange New World

The ability to switch the monitor's orientation raises issues other than quality. Software applications were written to assume that the Mac's display would always stay in one position during a work session. So, when an application is launched, it sizes windows to the screen. On the Radius Pivot, if you launch Microsoft Word while in portrait mode, the windows are long and skinny. If you launch Word while in landscape mode, the windows are shorter and fatter. If you flip between the modes, the windows don't automatically resize. (Microsoft Excel windows are an exception.) It's best to launch applications in the orientation in which you plan to use them.

With most applications, such as Claris's FileMaker, you can press the Option key and click on the file's title bar to resize the window. Applications that don't use Apple's standard Tool Box routines for zooming, however, won't work this way. For instance, if you flip from portrait mode to landscape mode with a long, skinny Word file open, the bottom of the window disappears off the screen into what Radius calls the dynamic region. You won't be able to scroll unless you flip back to portrait mode, resize the window, and flip back to landscape.

You can also lose access to small windows positioned in this dynamic region when you flip. I've had to rethink some of my work habits since I started using this monitor. Normally I tend to keep floating windows such as the Clipboard at the bottom of my screen. At first I lost those windows every time I flipped from portrait (my standard working choice) to landscape. Eventually I learned to move the windows before flipping the monitor, but





The Radius Pivot Display's beveled corner (bottom left) helps you figure out which way to turn the monitor.

Boundaries. Certain applications don't follow all of QuickDraw's conventions when drawing to the screen. If you rotate the Pivot while those applications are open, they won't properly redraw the additional screen area. Radius software lets you trick the application into thinking the screen is always 864 by 864 pixels, even though the real screen area is 640 by 840. Thus no matter which way you turn the screen, the image redraws properly.

### The Best of Two Worlds

The Pivot also includes a few other nice touches. Menus can be displayed in either 12- or 16-point type, and they can be torn off and left open anywhere on the screen. There's a screen-saver utility, a screen-capture program that creates PICT2 files, a cursor-location option, and a pop-up menu for changing the number of gray levels. You can even opt to have the monitor center dialog boxes in either orientation.

The Radius Pivot Display gives you the ability to choose whether the largest screen display area is horizontal or vertical. Most likely you'll leave the Pivot in one position for day-to-day work, changing it only for special-occasion uses. But any way you look at it, the flexibility is a plus.

—Cheryl England Spencer

See Where to Buy or circle 798 on reader service card.

old habits die hard. Radius has seeded major software developers such as Aldus, Quark, Microsoft, and Claris with the Pivot, in hopes that future versions of their software will recognize a switch in display orientation.

The Pivot's manual offers clear tips on ways to work around these problems. Radius also provides some specialized software for making work with the Pivot more efficient. If turned on, a Finder Cleanup option relocates icons to the right side of the screen so that they remain visible when you change the monitor's orientation. I found that I preferred to leave this option off, however, since it irritated me that the Radius software moved the Trash Can from its usual spot at the bottom of the screen and placed it near my hard disk icons. Instead, I made sure that I had opened a window showing the contents of my hard disk and placed that window where it would be accessible in either position.

Another software oddity concerns dialog boxes. Radius classes dialog boxes into two types: standard (boxes with double-lined borders, like a Page Setup dialog) and nonstandard (ones that have, for instance, a close box, like a Find dialog). If you try to change the monitor's orientation while a standard dialog box is displayed, the Pivot

recognizes the dialog box and won't redraw the screen, because the application software expects you to finish working with a dialog box before taking any other action.

The Pivot does not automatically recognize nonstandard dialog boxes, which are common in many applications. Radius has included default settings in the software to recognize some of these applications and their corresponding nonstandard dialog boxes. The software includes a scrolling list of these applications; you can update the list by adding or deleting programs, or changing the types of dialog boxes associated with programs in the list.

What happens if you don't update the settings, and Pivot redraws a dialog box? I tried to fool the Pivot by turning off the settings for MacWrite's dialog box types. I opened a document, opened a search-and-replace dialog, switched the Pivot's orientation, and tried to perform a search and replace. When I closed the dialog box, I found big white gaps of space between paragraphs and large black areas where text used to be. Although temporary, they still made working with the document impossible until I closed and reopened it.

In the same settings list is an option for creating what Radius calls Big

### Typographic Special Effects

## TYPESTYLER 1.01

**Pros:** Excellent visually oriented interface shows effects as you edit them; offers numerous ways to customize; works with a variety of fonts. **Cons:** Style variations of some fonts not supported; difficult to set point sizes and line widths precisely. **Company:** Brøderbund Software. **Requires:** Mac Plus; two 800K drives. 2MB RAM recommended. **List price:** \$199.95.

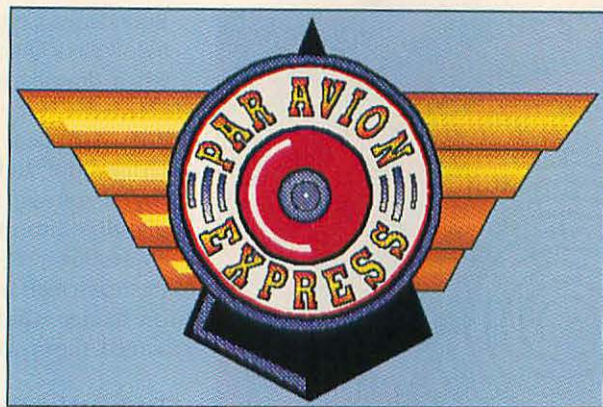


If you like tinkering with type, you'll enjoy TypeStyler. This accessible program lets you create and manipulate display and decorative type for headlines, logos, ads, and the like. TypeStyler offers 35 canned effects for type (arched, *continues*)



**Display Type**

TypeStyler lets you combine background panels and text effects to create custom display type. You can edit various attributes of the text and panels, as well as add artwork from other programs.



skewed, curved, fish-eye, and so forth) and 35 letter styles (inline, outline, filled, shadowed, 3-D, and so on). You can apply TypeStyler's effects and styles to any of the ten typefaces provided in the program's proprietary SmoothFont format. If you think you'll be restricted by the program's proprietary format, think again; TypeStyler 1.01 can smoothly convert just about any PostScript font—including Adobe's—into a SmoothFont. Likewise, you shouldn't balk at the idea of canned effects; TypeStyler offers numerous ways to customize letter shapes and styles.

**The Elements of TypeStyler**

TypeStyler's main window presents a set of basic tools that let you type, rotate, and reshape a block of text. The program presents you with a scrollable display of available effects and letter styles. If you don't see just what you want, you can customize a letter style, changing its fill color or pattern, outline width, or shadow. You can even fill letters with a gradient from one color or gray shade to another. Again, TypeStyler offers you choices: if you don't like the default options offered, you can edit a pattern or change the angle of a gradient fill.

TypeStyler gives you control over text positioning as well. A Type Options window lets you adjust letter, word, and line spacing; justification; and pair kerning. My only complaint in the type-control department is that it's difficult to set the point size for a block of text. A Default Size command lets you select the size at which text initially appears, and the program's ruler can help you measure text; but if you decide that you want to change a

block of text from, say, 36 to 40 points, you have to either eyeball it or change the default setting and retype it.

Once you've selected and customized an effect's shape and fiddled with its type style, you can use the main window's tools and menu selections to further modify your artwork. Like most graphics programs, TypeStyler lets you resize, expand, and compress a block of text. You can also use the resaper tool to alter text in various ways; you can stretch or slant a text block for a perspective effect, for example, or alter the shape of an arch. A panel tool lets you add a backdrop in any of several shapes. Like TypeStyler's text, panels come in 35 predefined styles; you can modify a panel's color, pattern, shape, and so on.

As you work on a TypeStyler document, you'll find that screen redraw can get pretty slow, especially if your Mac isn't bulging with memory. Fortunately, the program lets you speed up the screen-refresh time by displaying either a basic outline of the text, with no colors, patterns, or shadows, or—faster still—a rectangle that shows the boundaries of a text block. If you want to see the effect displayed in all its glory, simply click the painter tool.

**Output Options**

When you're satisfied with your custom creation, you have a number of output choices. You can print directly from TypeStyler to virtually any QuickDraw or PostScript printer, at the printer's maximum resolution. (Unfortunately, there's no tiling option for printing large documents.) Since TypeStyler supports color, you can take advantage of anything from an ImageWriter with a color ribbon to a

QMS ColorScript 100 PostScript printer. The program also lets you print color separations for four-color printing.

If you want to incorporate your effect into another application, you can save it in EPS, MacPaint, PICT, or Illustrator format. You can then paste the effect into a graphics program for further embellishment, or place the effect in a document created with a word processor or page-layout program. Since the latest version of TypeStyler works with Adobe fonts, it provides a bonus for those of us who have always wanted to get our grubby little hands on Adobe's encrypted font outlines. If you save a TypeStyler document in Illustrator format, you can open it in either Illustrator or FreeHand, ungroup and unlock the graphic, and then manipulate the lines, points, and curves that make up each character. (Note that although font outlines are exported to Illustrator, attributes such as shadows and styling are not; even so, I found TypeStyler's outline export capability to be one of its most useful features.)

**The Vagaries of Fonts**

The following problems are not necessarily TypeStyler's fault; they have more to do with the way Mac fonts operate. Nevertheless, you should be aware of these potential glitches before you buy TypeStyler.

TypeStyler's built-in Font Converter utility does a fine job of changing PostScript fonts to TypeStyler's SmoothFont format. I successfully converted fonts from Adobe, Agfa Compugraphic, Bitstream, Casady & Greene, Dubl-Click Software, The Electric Typographer, and The Font Company. Well, almost successfully. Unfortunately, if a manufacturer distributes *family-built* fonts, TypeStyler can't recognize styles such as bold and italic, and will convert only the plain, or roman, version of the font. (How can you tell if a font is family built? A good clue is to look at it in the Font/DA Mover; if the bold style appears in bold, the italic style in italic, and so on—rather than with a prefix of *B* for bold or *I* for italic—then the font is probably family built.) Because of this anomaly, I could convert only the plain (*continues*)





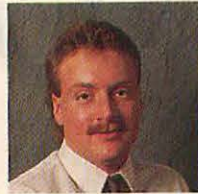
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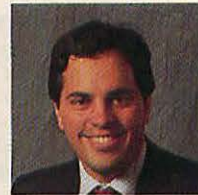
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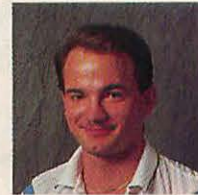
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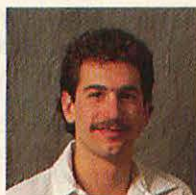
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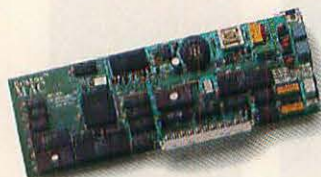
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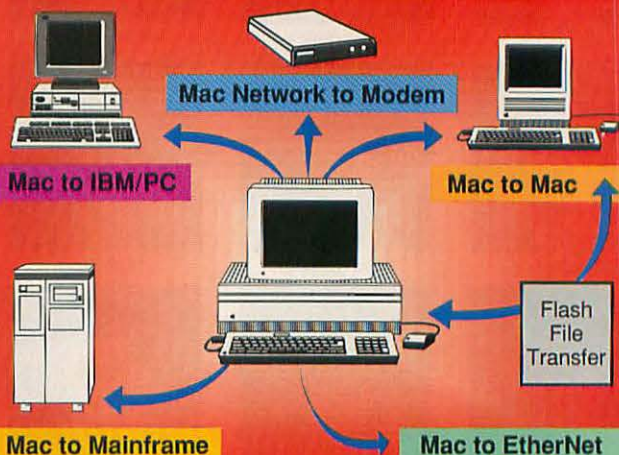
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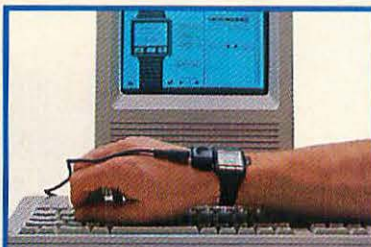
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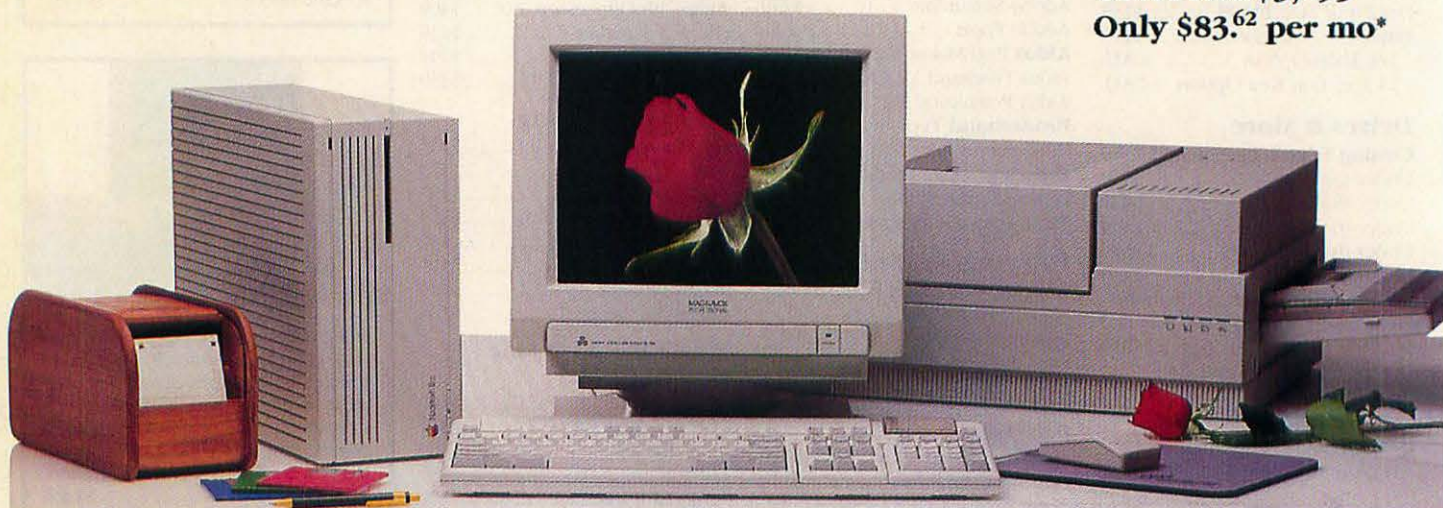
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Entry Coupons must be post marked on or before 10/31/90. Winners selected at random by attorneys of CDA. Odds of winning depends on # of entries. Winners responsible for taxes. All prizes will be awarded. Winner will be notified by mail. If unable to contact winner, an alternate will be selected by random drawing. Employees of CDA & suppliers not eligible. Dates subject to change at discretion of CDA. Contest is open to US residents except where prohibited by law. Prices & product specs are subject to change. Apple is a registered trademark of Apple Computer Inc. CDA is not an authorized Apple dealer. Product names are trademarks or registered trademarks of their respective companies.



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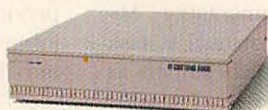
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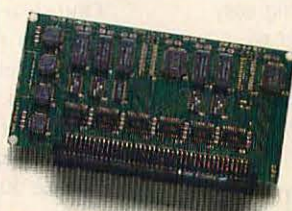
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The internal series comes preformatted complete with cables & mounting hardware.

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styles of various Bitstream, Agfa Compugraphic, Font Company, and Dubl-Click fonts. TypeStyler's manual suggests contacting font manufacturers to see if they have fonts available in a format TypeStyler can use.

Another problem surfaces with Adobe fonts, which essentially cheat and access certain characters from the LaserWriter's built-in Symbol font. These characters show up on screen in TypeStyler, but won't print. I didn't consider this a big problem, however; after all, how often does one use an infinity symbol or a greater-than sign in display type? Besides, these characters print fine from non-Adobe fonts.

Despite the aforementioned font problems, I found TypeStyler to be a wonderful program. It's easy to use, reasonably priced, and gives you a wide range of options when it comes to customizing, exporting, and printing effects. So why not add a little style to your next publication?—**Erfert Fenton**

See Where to Buy or circle 807 on reader service card.



## Telecommunications Programs

### MICROPHONE II 3.0

**Pros:** Good interface; excellent documentation; intuitive scripting; easy to use. **Cons:** No online help; no central phone directory. **Company:** Software Ventures Corporation. **Requires:** Mac 512KE; System 4.2. **List price:** \$295.

### WHITE KNIGHT 11

**Pros:** Wide range of features; strong product support. **Cons:** Illogical menu structure; no online help; proprietary key-board commands. **Company:** The FreeSoft Company. **Requires:** Mac Plus. **List price:** \$139.



Telecommunications software allows you to dial a bulletin board, use electronic mail, transfer files, or use online services. Telecom programs can save you time and money, and they are convenient. The two best programs in this category, MicroPhone and White Knight, have been upgraded and many features have been added. White Knight is the upgrade for Red Ryder—the program's name

change is due to a licensing dispute (Red Ryder Host, the commercial bulletin board system, is now called Second Sight 2.0 and is available separately from The FreeSoft Company).

Any telecommunications program offers the capability to dial a service, control the settings of a session, automate a log-on, or emulate a terminal. What sets MicroPhone II and White Knight apart from others is the wide range of options and their full-featured scripting languages for automating specialized tasks.

#### For Starters

Both programs make it fairly easy to choose settings, dial in to a bulletin board, and transfer files. White Knight is bundled with a utility called Okyto that simplifies file transfer. With Okyto you can simultaneously send and receive files over an AppleTalk network or a modem, chat, send folders, and examine the contents of the remote. Okyto's point-and-click environment is designed for beginners.

I found it difficult to choose between the two programs on the basis of features alone. But as I worked with one program, I kept finding small things the other program had that I missed.

One clear difference between the programs is the documentation. MicroPhone's excellent manual is task oriented and suited for beginners as well as experienced users. I like its tutorial approach and reference material. White Knight's feature-oriented manual, on the other hand, might intimidate a beginner. I had difficulty following the procedures for some of the more specialized tasks.

#### Making the Connections

I was somewhat disappointed that neither program makes full use of icons so that I could have a communications palette to work with. To the credit of both, however, it is possible to script a macro and attach an icon to it for almost any action you want. Although both programs now support color, it doesn't add much in the way of utility to their execution.

I found MicroPhone II's menus and dialog boxes to be much more logical than White Knight's menu organization. I had a hard time finding impor-

tant commands in White Knight, and many of its commands are not standard. For example, some keystroke equivalents use two letters, and dialog boxes take you directly to an action without confirmation.

Both programs default downloading files to the folder that is currently open on your system. To download the file to a different folder, or to a floppy disk, you have to first select the folder and then issue a file-transfer command.

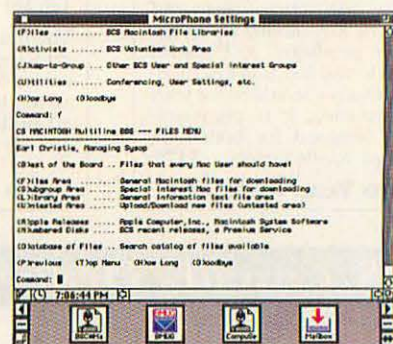
Both programs support all of the important file-transfer protocols: text, Kermit, Xmodem, Ymodem, Ymodem-G, and the newly incorporated Zmodem, along with several other variants and flavors. White Knight supports a somewhat wider range of specialized transfer protocols and has a much better set of filters (they're nearly universal). MicroPhone II now offers a batch file-transfer feature that is very useful. Both programs have added VT102 terminal emulation.

White Knight has a smoother screen response; MicroPhone II's text seems slightly jerky as it scrolls. I doubt most users will be bothered by this, however.

While both programs now permit you to compose and send a message online, neither allows you to go to a previously saved session and use that information. You have to import text into the program.

#### Script Please

The underlying scripting language makes either program worth the money. Both programs allow you to create complex password-protected (continues)



**MicroPhone II**  
The terminal window and icon window for MicroPhone II.



E-MAGINATION AT WORK

MACHINES

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Or write E-Machines, at 9305 SW  
Gemini Drive, Beaverton, OR 97005.



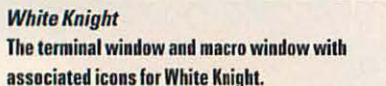
**E-MACHINES**

*E-Magination at work<sup>™</sup>*

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Circle 101 on reader service card





**White Knight**  
The terminal window and macro window with associated icons for White Knight.

Both MicroPhone II and White Knight also offer an automatic keystroke recorder, and the automatic scripting worked well in both programs. Using the script editor in MicroPhone II, or a text editor in White Knight, you can examine existing scripts and learn how to create your own. MicroPhone II offers scripts that enable you to log on to many popular online services.

In White Knight you build a script in a procedure editor, transfer it to a text file, and then compile it. White Knight has a complex scripting language, and compiled scripts run much faster than MicroPhone II's. There's also a built-in debugger. I found White Knight scripting to be full featured and intimidating, but advanced users will likely appreciate its power. The program also supports external commands that it calls RCMDs, which are specific to White Knight and not exchangeable with HyperCard externals.

On the other hand, advanced users will appreciate White Knight's wide range of features. And beginners should not rule it out either, especially since it costs only half as much as MicroPhone II.

**—B. A. Sosinsky**  
See Where to Buy or circle 777 (MicroPhone II), 813  
(White Knight) on reader service card.

## DISKTOP 4.0

**Cons:** No longer includes Widgets or LaserStatus utilities. **Company:** CE Software. **Requires:** Mac 512KE. **List price:** \$99.95.



mounted volumes (floppy disks, hard disks, or disk partitions) on one side and buttons for unmounting, ejecting, erasing, and renaming volumes on the other. The disk icon list now scrolls so you can see as many as 48 mounted volumes—more, I think, than most of us will ever need to see. Next to each icon, DiskTop displays the volume's total size, remaining free space, and other information.

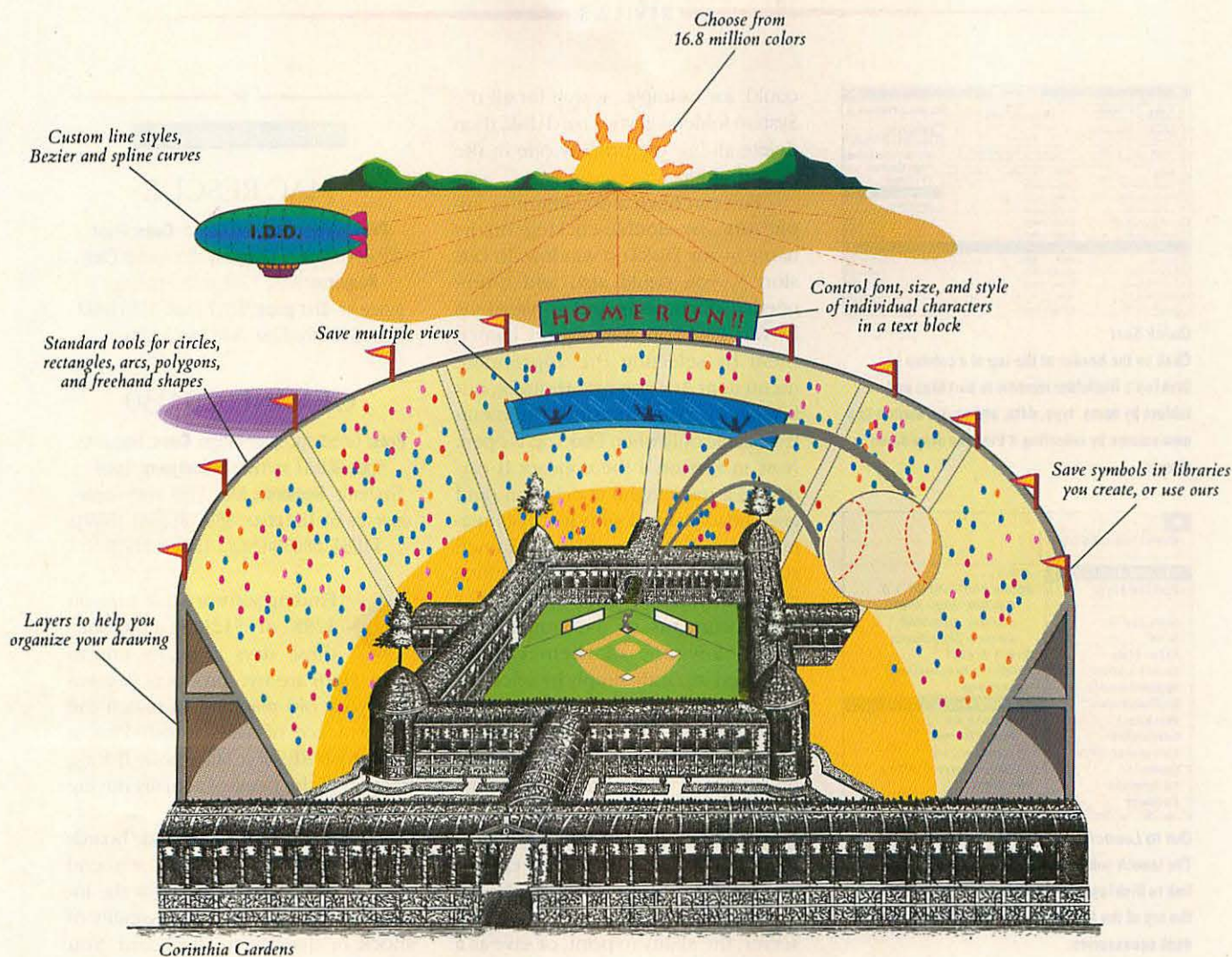
Double-click on any volume icon and the Files window for that volume opens; double-click on any folder and the Files window for that folder opens, and so on down the line. Action buttons and volume or folder information crowd the top of the window, and files and folders are listed below, much as in The Finder's View by Name window. If the user level is set at Technical, invisible as well as standard files are displayed. As in a standard file-selection dialog box, you can work your way up through a sequence of nested folders with the hierarchical drop-down menu; you can also move directly to any one of those 48 different volumes with the (new for version 4) drop-down menu.

You can delete, rename, move, or copy (to any volume or folder) selected files or folders with little more than the click of a button. You can add a new folder to the list, or create one on the fly (this is new for version 4) as you move or copy files. Select a folder, several folders, or an assortment of files, and the Size button tells you how much disk space they occupy collectively—a nice thing to know when you're copying files to a floppy.

DiskTop's Get Info command displays the same file information as the Finder's, and offers a special DiskTop comment box (which is immune to erasure should you rebuild the desktop) as well as the Macintosh's standard comment box. If you select the Technical user level, the Get Info window also displays and allows you to change a file's type, creator, and file bits—if you dare.

DiskTop's pièce de résistance was, and still is, its sophisticated finding abilities. Click on the Find button anywhere, any time, and you can search *(continues)*





## HOW TO UPGRADE A CLASSIC.

The original MacDraft® is a classic precision drawing program in its own right. And now, we've upgraded it. Introducing MacDraft 2.0. As you can see, it gives you even more powerful precision drawing tools. Plus many enhanced features like object and text rotation in less than 1° increments, up to 32X zoom, and PostScript®-quality printing. But we didn't change the easy-to-use interface that made the original MacDraft a favorite for over 70,000 users. If you'd like to experience MacDraft 2.0 for yourself, visit your nearest dealer. And see the classic drawing program that's way ahead of its time.



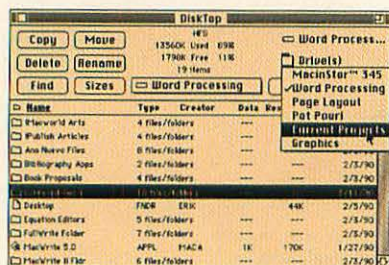
**MACDRAFT 2.0**

DRAW ON THE POWER OF THE MAC

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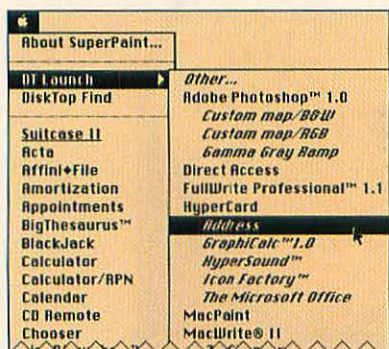
**Circle 508 on reader service card**





#### Quick Sort

Click on the header at the top of a column in DiskTop's file/folder window to sort files and folders by name, type, date, and so on. Switch to a new volume by selecting it from the drop-down menu.



#### Out to Launch

The launch submenu and DiskTop Find, a direct link to DiskTop's Find window, can be placed at the top of the Apple menu or integrated with your desk accessories.

some or all available volumes for files matching one or more criteria. DiskTop can search for files or folders with names that match or contain the search string; a file size, creation date, or last modification date within a specified range; a file type or creator that is the same as, or different from, the one specified (you can enter a four-letter type or creator code directly, or you can select a file whose type or creator is the same as the one that you're looking for).

When the search is complete, DiskTop can display the location of any file that's in the found file list, go to the Files window containing the found document, or launch the appropriate application and open the document. New for version 4, the list of found files can be copied to a special Found window, in which you can perform all the usual copy, move, delete, rename, and size functions on some or all of the found files, even if they are stored in a variety of folders or volumes. You

could, for example, search for all the System folders on your hard disk, then delete all but the primary one in the Found window.

You can open a document or application by double-clicking on its name in any DiskTop window. In version 3, you could also add often-needed documents and applications to the DiskTop menu, and launch them by selecting the appropriate menu item. It was a nice thought, but it wasn't very useful, since the menu is available only when DiskTop is open. Now in version 4 the concept is carried to a meaningful conclusion (and goes head-to-head with Icom Simulations' On Cue) by adding a launch submenu to the Apple menu. Once you add commonly used applications and documents to the launch submenu, any one of them can be launched instantly simply by selecting it (see "Out to Launch").

Other improvements incorporated in DiskTop 4 include an enhanced list of keyboard shortcuts; a click-anywhere, pop-up menu containing the launch submenu and a direct link to the DiskTop Find window; the equivalent of the Finder's Get Privileges command for folders on an AppleTalk server; the ability to print, or save as a text file, the files list in the current file/folder window.

DiskTop now comes with Gofer 2.0, a popular desk accessory that searches the contents of documents for phrases, dates, key words, and so on (see the April 1989 *Macworld* for a review of Gofer 1.0). Also included on the DiskTop disk are Vaccine, an out-of-date but still somewhat useful antivirus utility, and HeapFixer, a utility that can solve erratic performance problems caused by a shortage of System memory.

The only bad news is that two of my favorite multipurpose utilities that used to be part of the DiskTop package—Widgets and LaserStatus—have been dropped. But the good news is that DiskTop is even better than before, and still the best file-management utility I know of. Together, DiskTop 4.0 and Gofer 2.0 are an unbeatable pair; to be able to buy both for the price of DiskTop alone is a remarkable bargain.—Robert C. Eckhardt

See Where to Buy or circle 742 on reader service card.

#### Macintosh Upgrade Kits

### MAC RESCUE

**Pros:** Well-designed board. **Cons:** Poor documentation. **Company:** Computer Care.

**Requires:** Mac 128K with Apple upgrade kit. **List price:** \$317 (with 1MB RAM \$497 for 128K, \$407 for 512K).

### GEMINI 020/030

**Pros:** Good documentation. **Cons:** Requires special INIT software. **Company:** Total Systems. **Requires:** Mac 128K with Apple upgrade kit. **List price:** 68020/68881 16MHz \$1084; 68030/68882 16MHz \$1296.



Finding software that runs on 128K or 512K Macintoshes these days is nearly impossible. Here are two products that enable your old machine to match the performance of a Macintosh Plus, a Macintosh SE, or a Macintosh II for a fraction of the price of actually buying one of those machines.

Even though these upgrade boards are easy to install, I would recommend you have your dealer perform the installation because of the possibility of shock or damage to the board. You should also find a dealership that will guarantee its work for as long as possible, since the contacts between these upgrades and the CPU have a tendency to loosen after extended use. You will also need to buy an Apple 800K floppy drive and 128K ROM chips—a combo available from Apple as the Macintosh Plus Disk Drive Kit for \$299.

#### Mac Rescue

The Mac Rescue upgrade made my old 128K work like a Mac Plus. You can purchase the Mac Rescue board upgrade with 1 to 4 megabytes of memory and a SCSI port that is accessible through the battery cover. Once the board is installed, you're ready to go—there is no special software required. If you choose to do the installation yourself, you might find the documentation insufficient. I did, but the phone support offered by Computer Care was helpful.

Mac Rescue is compatible with all the software I tested it with. The SCSI (continues)



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Here's a short story that you've never heard before:

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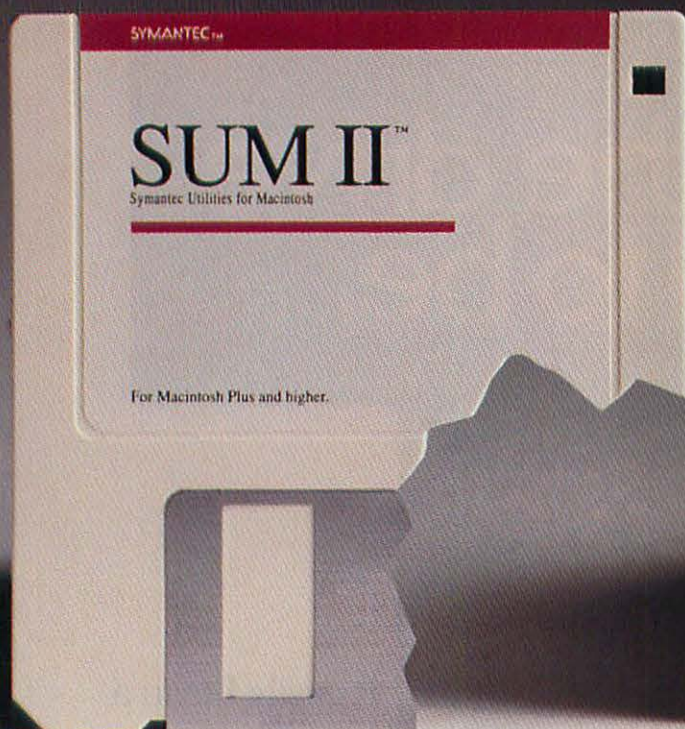
And see why the smart money buys from the smallest name in storage.



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**Circle 192 on reader service card**





# Some. All.

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Circle 357 on reader service card

MacTools Deluxe SUM II 2.0 FastBack II 2.0	
× ×	<b>Data Recovery</b>
× ×	File Undelete with View
× ×	Minor File Repair
× ×	Disk Protection
× ×	Hard Disk Crash Recovery
× ×	<b>Hard Disk Backup</b>
× ×	Multiple File/Folder Selection
× ×	Data Compression
× ×	Multiple Setup Files
×	<b>File Locator DA</b>
× ×	<b>Hard Disk Partitioning</b>
× ×	Automount w/Password Prompt
× ×	<b>Hard Disk Optimization</b>
× ×	Complete Disk Erase
× ×	Color Disk Map
× ×	<b>Secure/Encrypt File</b>
× ×	Desk Accessory
× ×	<b>Fast Floppy Copying</b>
×	<b>File Management</b>



port is wonderful—it lets you use a hard disk for all that powerful software that can't fit on an 800K floppy. If you already own a serial hard disk (a pre-SCSI hard disk that connects through the floppy drive port), you don't need to buy a SCSI hard disk to work with the upgrade; your old drive will still work just fine. Mac Rescue offers the power and speed of a Mac Plus (according to tests I ran with a shareware utility called Speedometer) at about half the Plus's retail cost and with a one-year warranty.

#### Gemini 020/030

Total Systems' Gemini 020/030 boards are designed to transform your 128K or 512K Mac to the functional equivalent of an SE/30 or a Mac II (depending upon the configuration you choose).

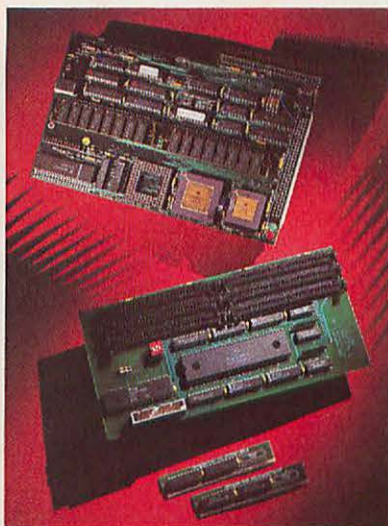
The Gemini boards come with a SCSI port, and they also include a fan to help your system stay cool. Unlike the Mac Rescue board, the Gemini boards need a special INIT called GemStart so the Mac can take advantage of the board's instruction cache, data cache, and proprietary SANE routines. (The boards also offer the option of loading the Apple ROM rou-

tines into RAM for faster access speed.) Since GemStart is very sensitive to the presence of other INITs, you might want to add a z in front of the INIT's name so it becomes the last INIT to load.

The Gemini boards come bundled with PLI's Turbo Optimizer and PLI's Turbo Cache, a disk drive accelerator. The documentation is very thorough and tech support was great—I had trouble getting GemStart to work properly, and the company faxed me the information I needed within two hours.

The Gemini 020/030 boards come in several configurations. You can start off with a 68020 chip at 16MHz on the board and upgrade with the 25MHz 68030 and 68882 chips. With the maximum 4MB of RAM, the 16MHz 68030 upgrade costs \$1596—much cheaper than a brand new SE/30 with 4MB of RAM (which costs \$4868). Best yet, since the Gemini boards can be installed with a 68030 chip that has the built-in PMMU, you will be all set to take advantage of the virtual-memory feature in upcoming System 7.0.

I used Speedometer to evaluate the performance of the Gemini upgrades. With the 16MHz 68020 and



The Gemini 020/030 board (top) provides an upgrade path with a 68020 or 68030 microprocessor and up to 4MB of RAM. The Mac Rescue board (bottom), which has six SIMM slots, allows a variation of memory configurations up to 4 megabytes.

68881 options, a Gemini 020-equipped Macintosh runs at about the same speed as a Mac II. The Gemini board with a 16MHz 68020 and a 68882, however, accelerates the speed to close to that of an SE/30.

These upgrades aren't only for vintage Macs—Macintosh Plus and SE owners who are using programs that take forever to redraw the screen should also give these Gemini boards a try. These new boards will extend the usefulness of your Macintosh and give your Mac renewed vigor.

#### No Free Lunches

Even though the speed of these upgrades approaches or exceeds the speed of a Plus, SE/30, or Mac II, the life cycle of a 256K ROM-equipped Macintosh (SE or IIcx) will probably be a few years longer than that of a 128K ROM-equipped Mac, due to design changes in the computer. Because the upgrade boards draw more power, the power supplies in vintage Macs are vulnerable to burnout.

All caveats aside, however, if you want to take advantage of the latest Mac software and keep up with the fastest machines around, don't leave your vintage Macs in the closet—consider upgrading them.—**Titus Wong**

See Where to Buy or circle 771 (Mac Rescue), 754 (Gemini) on reader service card.


## MACINTOSH UPGRADE KITS

Measured as times faster or slower than a Mac SE

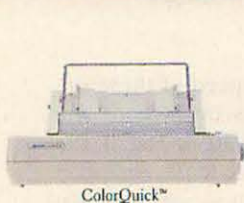
	CPU	Math	Disk	Overall
Mac SE with 20MB Apple hard disk is the standard	1.00	1.00	1.00	1.00
Mac Rescue with 1MB RAM	.87	1.02	2.55	1.24
Gemini 020 central processor with 68881 math coprocessor, both running at 16MHz with 4MB RAM	4.34	29.11	2.25	8.88
Gemini 020 central processor with 68882 math coprocessor, both running at 16MHz with 4MB RAM	4.74	29.11	2.26	9.12

Larger numbers are faster, smaller numbers are slower. Speedometer 2.0 tests include math-intensive operations, disk access, CPU-intensive operations, and overall system speed relative to a Mac SE. We used a Mac 128K system board with new Mac Plus (128K) ROM chips, a GCC UltraDrive 80MB hard disk, and System 6.0.4.

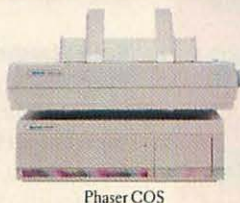




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Circle 143 on reader service card



★  
Three Screen Savers

## AFTER DARK 1.1

**Pros:** More modules than any other screen saver; excellent designs; programmers can create their own modules.

**Cons:** Limited point sizes in text-based modules. **Company:** Berkeley Systems.

**Requires:** Mac 512KE. **List price:** \$39.95.

## FISH 2.0

**Pros:** Works as screen saver or animates the desktop; includes icon editor and sample files; inexpensive.

**Cons:** Tiny icons. **Company:** Tom & Ed's Bogus Software. **Requires:** Mac Plus; System 6.0. **List price:** \$22.95.

## PYRO 4.0

**Pros:** User specifiable wake-up conditions; multiple ways to invoke; primary screen savers automatically cycle within a session. **Cons:** None. **Company:** Fifth Generation Systems. **Requires:** Mac 512K. **List price:** \$39.95.



Although it's more common on text-based computers like the IBM PC, screen burn-in can also be a problem on the Mac. If you leave the system on for extended periods of time displaying a single, unchanging image, eventually the image etches itself into the screen. To avoid this, the simplest solution is to either turn off the Mac or turn down the brightness when the Mac's not in use. Some of us, however, prefer the easier, automatic solution provided by screen savers.

Screen savers work by darkening the display whenever a specified period of inactivity has been reached (five minutes, for instance). And although a black display would certainly do the trick, screen savers add a bit of entertainment by displaying ever-changing animated pictures, interesting patterns, or scrolling messages.

Each of these screen savers operates as a Control Panel Device (cdev). You set options and features by selecting Control Panel from the Apple menu and clicking on the program's icon in the Control Panel display.

### After Dark

After Dark ships with 18 different screen-saver modules, including Starry Night (a night scene), Bouncing Ball (balls bounce around the screen), Can of Worms (worms squiggle), Clock, Fade Away (a simple dimmer), Hard Rain (raindrops splash and cover the screen), Life (a section of the screen transforms into an evolutionary simulation), Lissajous (geometric line patterns), Logo (a small bitmapped picture moves around), Messages (a moving text string), Picture Frame (color PICT images of your choice), Shapes (rectangles, triangles, and ovals), String Theory (moiré patterns), Warp (space travel at the speed of light), and Zot (lightning).

The three new modules included in version 1.1 are Doodles (screen scribbling), Nightlines (my preferred line-pattern screen saver), and Puzzle. The last named is my all-time favorite screen saver. It turns the display into a sliding block puzzle—like the Puzzle desk accessory that shipped with the early Macs. It's fun watching a word processing document breaking into blocks and shifting around on the screen.

Most modules can be customized—you can set the speed, number, and size of objects, and so on. And version 1.1 is now Ilii-compatible. If

you're a serious programmer, the manual provides instructions for creating and adding your own screen-saving modules to the After Dark shell. Examples are provided on disk using the MPW and Lightspeed versions of C and Pascal.

### Fish

If you've ever wanted an aquarium, but not the hassle of caring for pets, Fish may be what you're looking for. Fish has two modes: screen saver and desktop fish. With the latter selected, fish move constantly about your desktop, swimming peacefully around the edges of open windows.

You can set the number of minutes (from 1 to 60) of inactivity before Fish is invoked, choose a background color (black, white, or desktop pattern), determine how fast the fish move and how many should appear (up to 99), and pick sleep and never-sleep corners. With Edit Fish, you can create your own species by clicking in the squares of a design grid (see "Fish Editor"). Fish also includes a couple of sample files of images that can be imported into your current fish set.

Fish is entertaining and amusing. Its only shortcoming (more important on large displays than on the built-in ones of Mac Pluses, SEs, and Portables) *(continues)*

## SCREEN SAVERS COMPARED

Features	After Dark	Fish	Pyro
Number of modules	18	1	11
Color support	yes	yes	yes
Large-screen support	yes	yes	yes
Control Panel demo mode	yes	yes	yes
General on/off switch	yes	yes	yes
Set minutes until sleep	yes	yes	yes
Specify necessary conditions to wake up	no	no	yes
Set Sleep-now and Never-sleep corners	yes	yes	yes
Invoke from F-key	no	no	yes
Invoke from Finder menu	no	no	yes
Autocycling modules	no	NA	yes
Animated desktop	no	yes	yes
Password protection	yes	no	yes
Customizable	yes	yes	yes
Program new modules	yes	no	yes
Online help	no	yes	yes
Price	\$39.95	\$22.95	\$39.95

Here is a comparison of the significant features of After Dark, Fish, and Pyro.



# Sure beats sneakers.



One of the oldest file transfer methods known to Mac is about to become obsolete. You can now forget about using your "sneaker network" to run disks and files between computers around the office.

Introducing LapLink Mac III, the fastest, easiest way to transfer files between Macs or between a Mac and a PC.

LapLink Mac III is very versatile and lets you move files at speeds of nearly 3 megabytes per minute.

That's fast. And it's also easy, thanks to a simple interface familiar to anyone who uses a Mac. Just select the files you want to transfer and click on the copy button.

The new LapLink Mac III comes in two versions. The **Connectivity Pac** gives you everything you need to transfer files between two Macs or a Mac and a PC. You get a universal cable that connects a Mac to a PC or to another Mac. An accelerator that boosts Mac-to-Mac file transfer speeds to up to 750,000 baud. File translators

that make it simple to convert word processing documents from Mac formats to PC formats—or vice versa. And the ability to transfer files between two users over your existing AppleTalk cables or remotely over a modem. All for just **\$189.95\***.

The LapLink Mac III **Network Pac** lets you transfer files between five Macs on an AppleTalk network—without a dedicated file server or expensive hardware. Adding more users is as simple as buying more Network Pacs. And the Network Pac's suggested retail price of **\$299.95\*** works out to just **\$60 per user**. Not bad for a package that includes three-level password protection and remote modem access.

For more information, including a LapLink Mac III brochure, call us at **(800) 662-2652**, extension 202.

After all, why run your files around when you can use your computer?

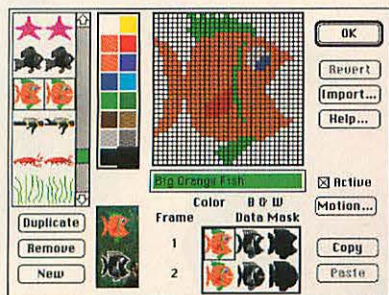
**LAPLINK** Mac 

\*Manufacturer's suggested retail price  
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Circle 304 on reader service card





### Fish Editor

Icons consist of two frames, each with a black data mask. The continuous flipping between frames and masks is what gives the icons their animation (shown in the box with the gray background).

is that the fish icons are small. If you were hoping for a life-size, realistic replica of an aquarium and its inhabitants, you'll probably be disappointed.

### Pyro

Like After Dark, Pyro uses modules—each of which can be tried out, selected, or turned off from the Control Panel. After Dark, however, allows you to choose only one screen saver at a time. Pyro automatically rotates from one to the next each time it is invoked during a computing session. It also distinguishes itself by offering more ways to invoke it than any other screen saver does. In addition to responding to the standard time setting and sleep-now corner (moving the cursor to a specific corner of the screen), it can be turned on by pressing an F-key or selecting the Sleep option from the Special menu in the Finder.

The included modules are Clock (analog variety), Fireworks, Aquarium, Blocks, Dimwit (a screen dimmer), Doughnuts (variations on the circle theme), Fireworks Too (fireworks with tracers that bounce along the ground), Kaleidoscope, Marquee (a billboard text marquee in any size up to 127 points), Restless Picture (moves a bit-mapped picture around), and Slinky (a screen slinky based on any of nine shapes).

Although you can't design your own, I prefer the fish in Pyro's Aquarium to those in Fish. They're bigger (two to three times the size) and more realistic, eat each other whenever a pair collides, and have a mode where they periodically face the front of the screen and stare at you.

### Never a Dull Moment

Each of the cdevs has something special going for it. Fish is delightful for small-screen systems and creative people who like to make their own creatures. With their modular approach, Pyro and After Dark offer a variety of screen savers and flexible customization options. My preference would be to combine my favorite After Dark modules—Nightlines and Puzzle—with Pyro's Aquarium, Marquee, and Restless Picture.—**Steven A. Schwartz**

See Where to Buy or circle 704 (After Dark), 751 (Fish), 796 (Pyro) on reader service card.

### Three Programs for Preschoolers

## MCGEE

**Pros:** Simple user interface; charming animation and sound. **Cons:** Kids may lose interest after environment is explored; incompatible with large-screen Macs.

**Company:** Lawrence Productions.

**Requires:** Mac 512KE. **List price:** \$39.95.

## THE PLAYROOM

**Pros:** Imaginative and original package of educational games that kids love to play. **Cons:** Key-disk copy protection may make package unworkable on some machines; expensive.

**Company:** Brøderbund Software.

**Requires:** Mac Plus. **List price:** \$69.95.

## PRESCHOOL PACK

**Pros:** Colorful display on a Mac II; variety of games and activities can be customized for a child's learning level. **Cons:** Most activities lack imagination; quality uneven. **Company:** Nordic Software.

**Requires:** Mac Plus. **List price:** \$69.95.



The Macintosh's friendly user interface has inspired dozens of programmers to produce educational software for preschoolers. Most of these programs use sound, animation, and games in an attempt to stimulate interest and make the educational process fun. But adults don't think like kids, so not all of these programs are successful at capturing the hearts and minds of their intended audiences.

To field-test the charisma of these three new programs, we carted a Mac SE into a local playschool for a few days and gave the three-to-five-year-old student body a chance to play with them. Some of these kids had never touched a computer; one had a Mac at home. All of them were enthusiastic.

### McGee

We started with McGee, an interactive picture story aimed at two-to-four-year-olds. This charming program (which only works on a 9-inch monochrome screen) lets users control the story as McGee explores his house before Mom wakes up. Below each scene are four large picture buttons. Clicking a button might tell McGee to bounce a ball, watch TV, throw a bone to the dog, take a bath, try to wake Mom, or go to the next room—every picture tells a pint-size story.

All of the kids quickly took to McGee—even those who had no experience with the mouse. The animated sequences and digitized sound effects instantly delighted the kids. Interest faded, though, after the kids had repeatedly explored all six rooms of the house and exhausted the surprises. (There were exceptions: Billy instructed McGee to wake Mom over and over because "I want to make her real mad.")

### Preschool Pack

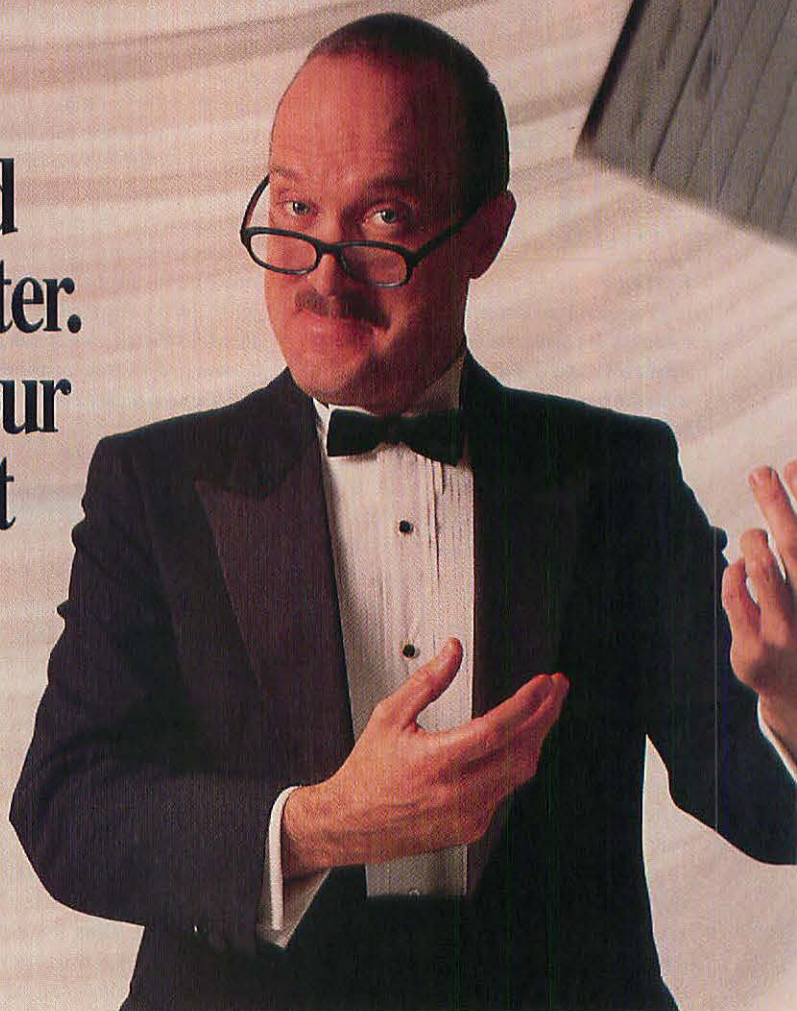
When we'd exhausted McGee, we turned the kids loose on Preschool Pack, a collection of diverse games and activities tied together with a picture menu. This package is similar to many other preschool Macintosh programs except for one distinguishing characteristic: it's the first little-kid program to shine in full color on an appropriately outfitted Mac (see "Counting in Color").

Everything also works fine without color, and the playschool kids enjoyed exploring this mixed bag, although they were clearly drawn to some activities more than others. The overall consensus was that Bar Math and AlphaWorks were boring after a few rounds. The kids liked the simple rewards of Counting 123 and the various shape-recognition games in Shape-*(continues)*



Dr. Productivity Says:

**"You trashed  
your typewriter.  
Now trash your  
office in/out  
board."**



**"Never wonder where the heck  
George went again."**

"The busier your organization, the more time you waste running around looking for people. 'Where's George? Should we start the meeting? Should we wait? When will he be back? How can I get him the moment he gets back?' Blah blah blah. Time down the toilet. Fortunately, there is a cure."

**"You can let everyone wonder  
where the heck you went. Or let people  
know where you are in a flash."**

"The latter is for smart people. In/Out™ lets you post your whereabouts with a five-second pull-down. Click and go. You can even create short cuts for your frequent outs, like playing tennis, at lunch, at the psychiatrist, whatever. Bang. You're electronically posted. And your own screen gets a 'sleep' message that's a combined screen saver and time saver,

because it shows anyone who looks into your office where you are."

**"If you want exercise, go to a gym.  
If you want to know where anyone on  
the network is, click the mouse."**

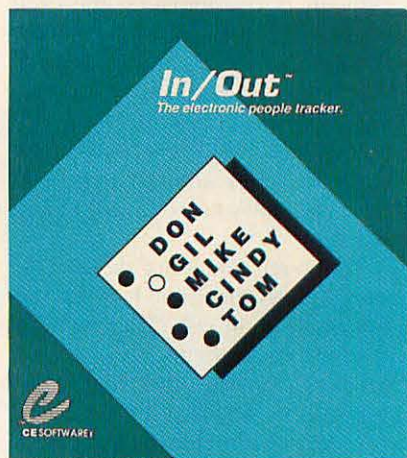
"Anyone can hot-key at any time from any Mac® on the network, and get an instant electronic In/Out board of the entire office, or any department. Click on any individual, and get the details of their return time and whereabouts. Save countless steps."

**"Now your receptionist can stop  
paging everyone to death."**

"Callers will appreciate how quickly your receptionist can locate people. Your operation will run smarter, smoother. Your electronics will astonish your friends. And your reception area will look a lot better. The in/out board is dead. Long live In/Out."

**"Go to a dealer  
and try it."**

For the Macintosh. Suggested retail price: 10 user pak: \$299.95  
Free literature and Where To Buy:  
1-800-523-7638 Dept. CE31.





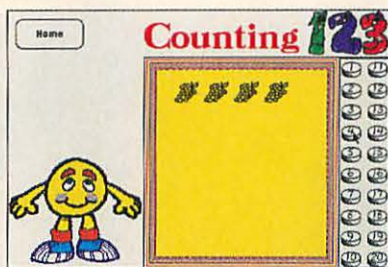
Works. (Nonreaders occasionally needed adult help to follow written game instructions.) The clear favorite, though, was Concentration, the familiar memory matching game.

From a teacher's point of view, Preschool Pack has great potential, since it includes a wide range of activities and a mechanism for customizing them. After the teacher creates a custom cycle, a child can do each of the activities in sequence at the level that's most appropriate.

Unfortunately, the Playschool crowd quickly figured out how easy it was to defeat our attempts at educational authoritarianism. In a typical situation, we created an educationally appropriate learning cycle for one girl and left her to work through the cycle. When we returned a few minutes later, she was playing Concentration with a few of her classmates.

### The Playroom

By the time the kids tired of Preschool Pack, they were computer-wise enough that more electronic worksheets offered little temptation. But when we booted up The Playroom, even the most jaded of the bunch was immediately hooked by the opening screen, a cartoon playroom scene cluttered with cute and responsive toys and games. Some of the toys simply respond to mouse clicks with simple animation and sound bursts; others serve as gateways to a collection of



### Counting in Color

Preschool Pack takes advantage of color to dazzle young learners.

engaging educational games.

The hands-down favorite was the ABC Book, which allows kids to arrange scenes to tell stories using characters and props that appear each time an alphabet letter is clicked. In addition to reinforcing beginning alphabet skills, ABC Book stimulates kids to tell imaginative stories to go with their pictures.

Not far behind in popularity was the MouseHole, a three-level on-screen board game that introduces basic addition and subtraction skills while allowing kids to develop game strategies. All of the kids found something to like in this cleverly designed game.

The other games, while less popular than the Mousehole, still attracted players. The kids enjoyed watching the pictures change in The Cuckoo Clock when different hours were clicked, even though the concepts of time being taught frequently went over the heads of most of them. The Mixed-Up

Toy was a fun matching activity for younger kids who found some of the other games too difficult. The Spinners Toy was fun for the younger kids because it offers entertaining animated rewards for correctly counting objects on the screen. The least popular of the bunch was the word-and-letter-oriented Computer game, probably because the on-screen miniature computer looks more intimidating than the other, more cartoony, games.

But even the program's less popular games were explored by most of the kids; there's something about The Playroom that invites children to look into every nook and cranny. Unlike the activities in Preschool Pack, The Playroom games didn't tempt our kids to look around for the escape hatch. Most of these games were so much fun that the kids enjoyed playing them time after time. (The exit and other adults-only commands, including some that allow program customization, are hidden in a menu bar that becomes visible only when  $\mathbb{H}$ -Space is typed.)

### Copy Cat Blues

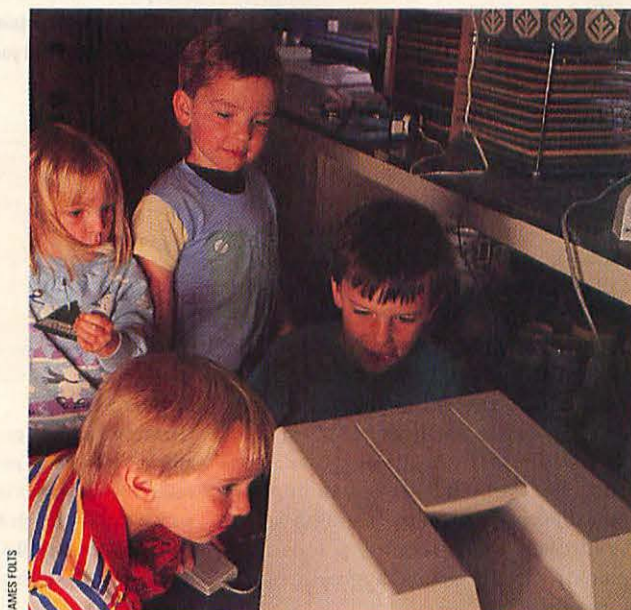
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At press time, Brøderbund claimed to be working on a way around the problem. If they fix it, we'd recommend The Playroom as the best value of these three programs, because it weaves educational concepts into an imaginative game format that entices kids to learn as they play. If not, you'll have to decide for yourself whether it's worth the risk.

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See Where to Buy or circle 773 (McGee), 793 (The Playroom), 795 (Preschool Pack) on reader service card.

Students at the United Methodist Cooperative Playschool in Corvallis, Oregon, enjoyed testing software written for their age group.





★  
Active Star-Hub

## TURBOSTAR

**Pros:** 16 ports; hub managed via AppleTalk; LEDs for quick status report.

**Cons:** Poor documentation (not suited for inexperienced network managers or installers); no rack-mountable option.

**Company:** Nuvotech. **Requires:** Mac 512KE; LocalTalk or PhoneNet; punch-down block or patch panel. **List price:** \$1795.



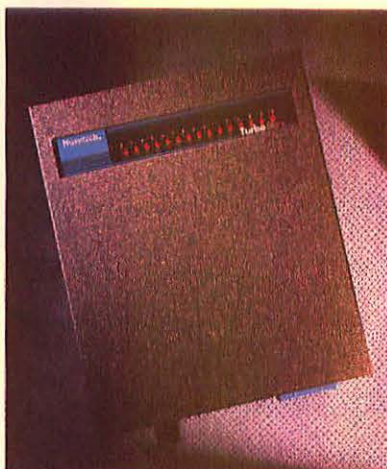
Large AppleTalk networks live and die by their configuration. One of the most useful network devices for expanding AppleTalk networks on twisted-pair cable has been the active star-hub, which increases the maximum allowable total length of a network's cables and allows the network manager to control and analyze network functions. For the past two years Farallon's StarController has had the market to itself, but now there's a worthy competitor, the Nuvotech TurboStar.

The TurboStar has four features that distinguish it from the StarController: a larger box; 16 ports; a set of red and green LEDs to indicate the status of each port; and administration that can be accomplished from any Macintosh on an AppleTalk network connected to the TurboStar. At a price that's \$500 more than the StarController, is TurboStar worth it? Let's take a look.

### Installation

Installing the TurboStar is a cinch for any experienced AppleTalk network installer. Like the StarController, the TurboStar is plug-compatible with a punch-down block, but the TurboStar offers four more ports per star. However, the documentation offers barely enough information to install the unit; inexperienced users will have a hard time installing TurboStar and configuring the network topology.

The TurboStar can be connected to Nuvotech's rack-mountable patch panel (other RJ-11 patch panels could presumably be used). Unfortunately, the TurboStar itself cannot be rack mounted. (The StarController cannot be rack mounted either, although Cactus Computer's new StarBurst



TurboStar from Nuvotech

module plugs into the back of a patch panel, making it a space saver.)

You use the TurboStar application to configure the TurboStars on your network. After selecting which TurboStar should be configured (each TurboStar can be named, and access is password protected), you assign names to each port and decide which ports should be active. In addition, the application lets you store up to 100 characters of information about each port; to access the information you click on the button containing the port's number on TurboStar's main screen (see "Information Please").

### Diagnostics

There are two ways to diagnose network problems using the TurboStar. The first, and easiest, is to look at the LED display on the front. All functioning ports have a lit green LED; closed ports (those disconnected by the manager) have a lit red LED. If a line connected to a port is experiencing errors, its red LED flashes continuously until you either solve the problem or disconnect the port. In contrast, the Farallon StarController provides no LEDs or similar devices for a quick status check—you must diagnose and solve all problems from a Mac connected via the management bus.

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The idea behind a separate management bus is to provide access to the star hub when the entire network goes down. However, it's highly unlikely that all 16 segments of a TurboStar will be inoperative at the same time. If one segment of the star is down, you can always take the TurboStar application to another Mac on the network to find the problem.

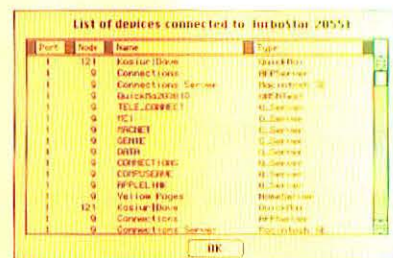
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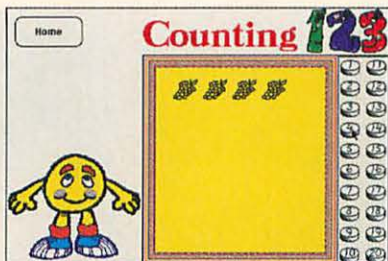
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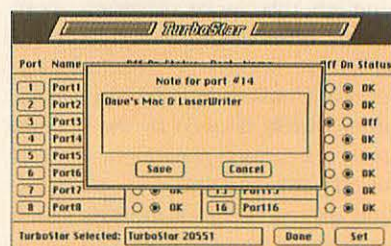
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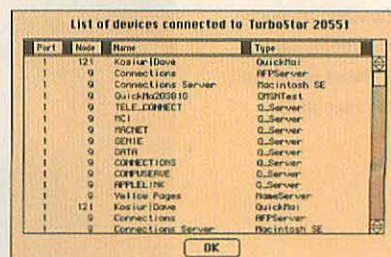
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# Best Performer!



## *FoxBASE+ /Mac: The Most Celebrated Mac DBMS Now Includes a Powerful Report Writer!*

**New  
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New FoxBASE+ /Mac Version 2.00 is here—and stealing the show! In its first year, FoxBASE+ /Mac won more awards—both in the U.S. and Europe—than any other DBMS ever created for the Macintosh! And Version 2.00 is faster and more powerful than ever—packed with innovative new features and language enhancements!

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- **Page Layout:** Designate many layout settings for your report: number of columns, left margin setting, column width, space between columns, measurement size for each page, and more!
- **Report Layout Window:** Define the different areas within your report, using FoxReport's new "band" system. Start with the default bands: Page Header, Body, and Page

Footer, then bring in other bands like Title, Summary, Column Headers and Footers, etc.

- **Object Menu:** Control the Type Font, Sizes and Styles of text objects. Fill and Pen options let you change the color and shading of almost every object!

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Perrysburg, OH 43551 Telex: 6503040827 Fox

Circle 152 on reader service card



like graph of network load, and a list of all devices connected to the TurboStar. (Remote devices attached to the TurboStar have an *R* displayed next to their port number.) You can save this list of devices as a text file.

### Final Say

At \$1795 for 16 ports, the TurboStar's price per port (\$112) compares favorably with the Farallon StarController (\$1295 for 12 ports, or \$108 per port). The TurboStar's LED panel provides a quick diagnostic check of the network, and star management via the AppleTalk network does not appear to be a liability. If you're expanding an existing network and are familiar with star hubs, you should definitely consider the TurboStar. However, if you're new to networking, I cannot recommend the TurboStar until Nuvotech upgrades the documentation.

—Dave Kosiur

See Where to Buy or circle 806 on reader service card.

## Iconic Programming Package

### HOOKEUP

**Pros:** Allows complex program logic to be easily represented and edited by connecting icons on screen. **Cons:** Sophisticated effects may require understanding of intermediate or advanced programming concepts; no Undo command; difficult to edit overlapping program elements; copy protected.

**Company:** Hip Software Corporation.

**Requires:** Mac 512K. **List price:** \$149.



For the past year or two we've all heard a lot of predictions that user-programmable software will be the next big thing in personal computing. HookUp, another product from Hip Software, is on the crest of that do-it-yourself-software wave—but this new program is not quite the utilitarian grail industry pundits were imagining.

### Software Doodling

Instead, HookUp's turf is purely recreational. With HookUp, you can build fairly complex animated scenes, use the mouse to play music or sound effects, or combine sound and animation in little multimedia software

gizmos—and that's about it. Still, although HookUp shares the entertainment orientation of earlier construction-set products, the sophistication and flexibility of its programming tools provide an instructive model for developers of tomorrow's highbrow software toolkits.

HookUp is aptly named. You're given a set of icons representing various programming functions, and you hook these icons together by dragging them into position. The hookups between icons are represented by on-screen lines called wires. The network of icons and wires represents the flow of your program's logic.

The simplest connection you can make is to join an input icon directly to an output icon. An input translates something you do—moving the mouse, typing in a number, or playing a key on a MIDI keyboard, for instance—into a numeric value and then (metaphorically) sends that value over a wire leading away from the input. In turn, an output does something in response to the value it receives—such as displaying the value as a number or a point on a graph, or switching to a different graphic to simulate animation. For example, if you hook up a slider input icon to an output box icon, moving the slider's control knob varies the number appearing in the output box. Likewise, you can hook up the mouse input to a sound-generating output, so that when you move the mouse, you hear various sounds. To produce an animated scene by rapidly alternating pictures, you connect an animation output icon to three inputs: one for selecting the picture to

be displayed at the moment, and one each for controlling the horizontal and vertical position of the picture (you must use MacroMind's VideoWorks II to prepare your artwork).

Things quickly get more complicated as you add more inputs and outputs to your program, especially if you utilize some of HookUp's many icons that each have both input and output functions. The Add icon, for instance, receives values from two wires, adds them together, and sends out the total on a third wire. Then there's the Switch icon, which sends out one of two incoming values, depending on whether or not a third incoming value is zero. The Clock icon's basic function is to count time, but I won't try to explain the ways that incoming values can change its count.

### Programming Logic Needed

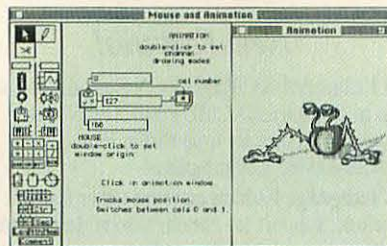
If you can master the use of these complex controllers, you can achieve video game-like sound and animation effects. But while HookUp streamlines the mechanics of programming, you'll still need a fairly advanced grasp of programming logic to get sophisticated results. On the other hand, you can just start hooking up icons to see what happens; with some hands-on experience and a little study of the sample files, you should be able to pick up the necessary concepts.

HookUp does suffer from several shortcomings when it comes to the nuts and bolts of basic operations. For one thing, there's no Undo, a feature you'll miss as soon as you start experimenting. And the fact that you can't explicitly select a particular icon or wire in order to move or delete it, even when two or more of them overlap, makes it too easy to move or delete the wrong one. Watch out too for some confusing terminology in the manual: an input can mean either an input icon or the connection at which an output or other icon type receives an incoming value.

These caveats notwithstanding, Hookup is easy to use, fun to play with, and intellectually challenging. And while you can't call HookUp practical, it's one more sign that we'll all be programmers before long.

—Steve Cummings

See Where to Buy or circle 756 on reader service card.



### Wired Icons

A HookUp program, displayed as a network of icons connected by wires, can get confusingly crowded, but you can add comments to clarify what's going on. Animated scenes appear in a separate window, which can be enlarged to fill the screen.



# We developed Pacific MacPage because affordable PostScript® printers are just a dream.



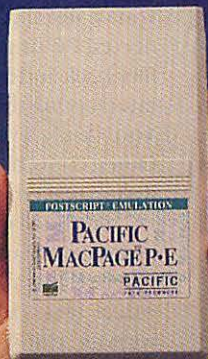
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DATA PRODUCTS



Circle 378 on reader service card

\*IID duplexing feature not supported in PostScript mode.  
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## File-Transfer Utility

## LAPLINK MAC III

**Pros:** Fast, easy file transfers; background operation on the Mac; file management features for both Mac and PC.

**Cons:** Has translators for only two Macintosh text-file formats; translation feature unavailable on the Mac portion of the package; Mac and PC portions have inconsistent user interfaces.

**Company:** Traveling Software.

**Requires:** Mac Plus. **List price:** \$189.95.



LapLink Mac III is faster, more complete, and better laid out than the original LapLink Mac, and it now permits transfers between Macs as well as between Macs and IBM PCs—but there's still considerable room for improvement.

Like all "cross-cultural" file-transfer programs, LapLink Mac consists of two separate programs: one runs on the Macintosh, the other on the PC. In earlier versions, the Mac portion was an entirely passive partner in the file-exchange process—you had to carry out all file transfers from the PC. Version III, however, caters equally to Macintosh and PC users, and you can now transfer files and operate most other program commands from either machine.

### One Size Fits All

The product comes with its own one-size-fits-all cable, which has an 8-pin DIN Mac connector at one end and the same plus a 9-pin and a 25-pin PC serial connector at the other. Your files flow between a Mac and PC at a fleet 115,200 bits per second (bps); but when you connect two Macs and plug in the supplied accelerator unit, data moves at the blistering pace of 750,000 bps. The package also supports modem speeds from 1200 to 9600 bps.

Whether you're sitting in front of a PC or a Mac, the LapLink screen shows a side-by-side display of the files in the current folder on each machine. Using the mouse or keyboard, it's simple to copy files individually or in groups you select manually or by specified name or date. In addition, you can easily control options such as whether files being transferred replace

their namesakes automatically on the target computer.

Still, the process is not as easy as it might be. For one thing, the menus, available commands, and keyboard shortcuts are somewhat different in the Mac and PC parts of the package, so you're forced to learn the program twice if you need to use both components. What's more, the PC portion's interface also differs considerably from that of Traveling Software's LapLink III, a popular PC-to-PC file-transfer program.

### Not in Translation

Moving files from one computer to the other is often only the first half of a successful Mac-to-PC or PC-to-Mac transfer. If you are transferring text, spreadsheet, or database files, you must also find a way to convert each file from its original format to a format that can be understood by the program that will read it on the destination computer.

Although LapLink Mac III goes much further than its predecessor in dealing with this part of the problem, its software translators—the utilities that actually perform the file conversions—run exclusively on the PC. In fact, you can't even access them from the Mac portion of LapLink Mac. Besides, LapLink has too few translators to begin with. On the Mac side, the package can only convert to or from ASCII and MacWrite formats, while on the PC side, it handles WordPerfect (releases 3 through 5), Microsoft Word (3 through 5), WordStar (3.3 through 5.5), DCA, MultiMate, XyWrite, and ASCII formats. Of course, most Mac word processors can read and write MacWrite files, and the Mac versions of Word and WordPerfect read files generated by their PC counterparts. Nevertheless, direct conversions to and from more Macintosh formats would make the process smoother. And LapLink Mac still lacks translators for database and spreadsheet files. LapLink's chief competitor, DataViz's MacLink Plus, comes with a broader collection of translators, all of which run on the Macintosh.

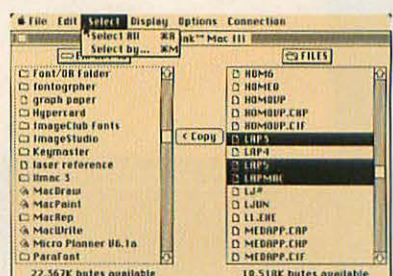
### Behind the Scenes

One of LapLink Mac III's best new features is its ability to operate in the



### LapLink's PC Screen

Note that the menu bar at the top of the screen offers fewer choices than the one on the Mac screen, and the pull-down menu's options are different.



### LapLink's Mac Screen

You can select and copy any group of files to the destination computer, in this particular case an IBM PC.

background on the Macintosh while other programs are running. Once you've installed a special INIT, a connected PC or a second Mac can move files back and forth without noticeably interrupting the work of the first Mac. You don't even need MultiFinder. Other conveniences include file- and disk-management features on both the PC and the Mac. Depending on which port you are using, you can create or delete folders, rename or delete individual files, or view PC text files, all without exiting LapLink Mac III (although in my tests the program could only display the first several kilobytes of each text file).

If you value efficient file translation as much as you value background operation or raw speed, you'd be better off with MacLink. On the other hand, if an MS-DOS computer is your main machine, LapLink Mac III is definitely for you. For those Mac users who prize speed or rarely need to translate between file formats, LapLink's quickness and convenience features certainly give it the edge.

—Steve Cummings

See Where to Buy or circle 765 on reader service card.



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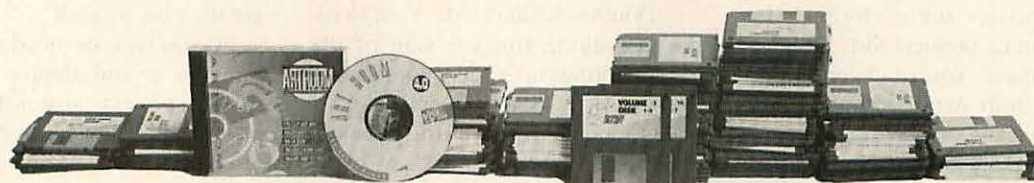
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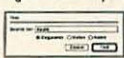
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★  
Project Manager

## KEYPLAN 1.0

**Pros:** Integrated outline; screens and reports extensively customizable. **Cons:** Sub-projects can't exist as separate files; lacks advanced features like plotter support, online tutorial, and spelling checker. **Company:** Symmetry Software Corporation. **Requires:** Mac Plus. **Hard disk recommended.** **List price:** \$395.



Symmetry Software, the folks who brought you such hits as Acta Advantage, HyperDA, and PictureBase, now bring you KeyPlan, "The Key to Getting Things Done," a project-management program developed by Australia's Interkey.

Any Macintosh project manager invariably invites comparison with the acknowledged market leader, version 2.0 of Claris's MacProject II. There are other contenders to be sure, notably MicroPlanner, but to date MacProject is the one to beat. With a street price as much as a third less than MacProject, KeyPlan should generate immediate appeal. Whether budget-conscious project planners prefer KeyPlan over MacProject will depend largely on how they like to think about their projects and how complex their projects are.

**A Key Advantage**

With its Outline view, KeyPlan neatly accommodates my preference for brainstorming projects with a full-featured outliner. You can even import outlines from Acta Advantage (see "Outline View").

All views are integrated, so you can switch between them at will. Even while still making your list, you can switch to KeyPlan's Plan view to create a PERT chart (program evaluation review technique)—one of the standard ways of viewing and reviewing projects (see "Plan View"). The Plan view is initially a large blank screen containing two tasks, the project's beginning and ending milestones. The tasks you create in the Outline view are listed in a smaller standard Macintosh resizable window. Attached to each task is a miniature task box that you can drag out onto the Plan view.

In the Plan view's main screen, the task box expands and contains the text you typed in the Outline view to describe the task. Connect the boxes with lines showing their dependencies and voilà, you have a PERT chart. Dependency lines on a project's critical path appear bold or, if you have a color monitor, in red. You can, if you prefer, create tasks directly in the Plan view by selecting New Task from the Edit menu; but this isn't as slick as MacProject's method of drawing boxes to represent tasks. Using either method, you enter specific information about the task—Early Start Date, Early Finish Date, Resource Cost, Manager, and so on—in the Task Info window at the bottom of the screen or in a movable Task Notepad window. KeyPlan, as well as MacProject, allows you to place such task-specific information into text fields around the four corners of the boxes.

In addition to the Outline and Plan views, the program has five other views: Bar Plan, which presents what is more commonly called a Gantt chart, or time line of the project; Graph, in which you can chart more than a dozen different criteria in line, area, scatter, or bar charts; List, in which you can create and view tables containing any and all of the data entry fields in endless permutations; Overhead; and Resource. KeyPlan lets you access each of the views by clicking on their icons, as well as by choosing them from the View menu.

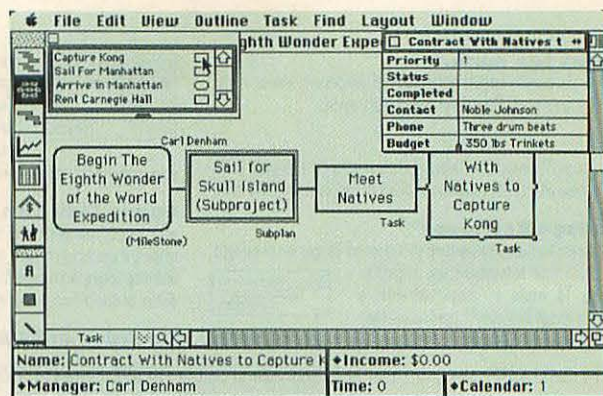
Double-clicking on the View icons, located along the left side of the screen, brings up screens for customizing views. With the exception of Resource and Overhead, all the views can be extensively customized, with the

names of custom views being automatically installed on the corresponding submenu of the View menu. (In Resource and Overhead, you can only change the sort order and display font.) Having the name installed on the submenu is a slick feature, but the integrated HyperCard-based help system was of no help in discovering it. Calling up help when in the Edit Graphic Display dialog box overlays a HyperCard-like image of the box, in which you can click on any area for information. Unfortunately, help-system navigation buttons obscure the box where you name your view. Equally annoying is that to get help, you have to click on the View's icon (⌘-? works, as well), which is repeated within the dialog box.

**Some Key Differences**

While I much prefer KeyPlan's outline method of project creation and I believe the program's ability to call up views by clicking on icons is more Mac-like than MacProject's menu-only approach, these features might not be valuable for you. It might be more important to determine whether or not you can live with KeyPlan's less rich set of features. For instance, KeyPlan lacks automatic resource leveling, the ability to automatically resolve conflicts caused by overscheduling of people or other resources by rescheduling tasks or changing a resource's percentage of effort. KeyPlan does reveal resource conflicts, but you have to rejigger the plan yourself.

If you typically need to roll up or integrate several subprojects into one master project, you will be disappointed by KeyPlan's rudimentary (continues)

**Plan View**

You build a PERT chart by dragging tasks out of the window in the upper-left corner of the screen. Selecting New Task from the Edit menu places an unlabeled task in the window. Once dragged onto the chart, you can label it directly or use the Name field.



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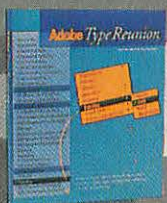


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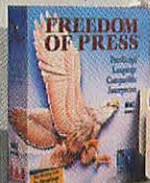
# MacSHOCK



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Dust Cover — ImageWriter II (grey nylon) .....	\$11
Dust Cover — Mac IIcx RGB & Extended Keyboard .....	\$12
Dust Cover — Mac Plus and Keyboard (grey nylon) .....	\$11
Dust Cover — Mac SE & Extended Keyboard .....	\$11
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Teak Disk Holder — 100 .....	\$21
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<b>I/O Designs</b>	
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### Sony

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QuickMail 2.2 (1-5 users) .....	\$218
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CompuServe Subscription Kit .....	\$24
CompuServe Navigator .....	\$49
<b>DataViz</b>	
MacLink Plus w/Cable 4.1 .....	\$119
MacLink Plus/Translators .....	\$96
<b>FreeSoft</b>	
White Knight 11.0 .....	\$85
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<b>TOPS</b>	
InBox 3.0 .....	\$215
InBox Plus 3.0 .....	\$628
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Mac .....	\$188
TOPS 3.0 Network Bundle .....	\$165
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<b>Traveling Software</b>	
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LapLink III — Connectivity Pac .....	\$119
LapLink III — Network Pac .....	\$185

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<b>Blyth</b>	
Omni 5 .....	\$355
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FileMaker II .....	\$218
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MacSnap 524E .....	\$185
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Infinity Turbo Dual 40 Meg .....	\$1,798
Turbo Floppy .....	\$345
<b>Power User</b>	
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30 Meg Drive .....	\$359
40 Meg Drive .....	\$399
60 Meg Drive .....	\$459

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MacKids (all volumes available) ea. ....	\$28
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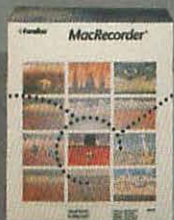
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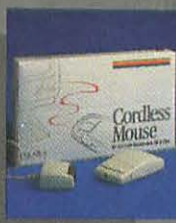
# MacSHOPPER



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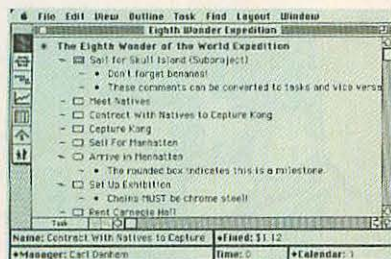
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### Outline View

Brainstorming your project is a snap with this full-featured outliner. You can rotate the fields at the bottom of the screen by clicking on the diamonds that precede the field names.

subproject-management capability. Unlike MacProject, KeyPlan's subprojects can not exist as separate disk files—they are all part of the master plan. Further, a subproject can appear only as a single task on the master PERT chart, identified as a subproject by its double-line box. If you want to see a subplan's PERT chart you simply double-click on the subplan task box to bring up the chart, which you can then print separately.

The program's documentation is adequate, but it doesn't use standard project-planning buzzwords (like PERT, CPM, and Gantt chart), and the manual includes little about project-management theory for managers with little or no formal experience. Because KeyPlan is supposedly aimed specifically at just such managers, I think some project-management education is in order.

### The Key to Success

Despite my misgivings about KeyPlan's rough edges, I like it. It's a capable program, with which you can get familiar—and productive—immediately. If, like me, you can't imagine using a project planner without an integrated outliner, it's the only game in town. If your projects run more to product introductions or trade-show participations rather than developing chemical plants or building rocket ships, you'll find the program has power to spare. And if you bought shares of Xerox way back when it was still Haloid Corporation, or Tokyo real estate in the 1970s, you'll want to buy KeyPlan today. Remember, this is only version 1.0. I have a very strong feeling 2.0 is going to be a killer. —Tom Wrona

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### File-Saving Utility

## AUTOSAVE II 1.1

**Pros:** Easy to use; unobtrusive in operation. **Cons:** None significant.

**Company:** Magic Software. **Requires:** Mac 512KE. **List price:** \$49.95.



It's happened to most computer users at one time or another. You're on a deadline, working frantically to get your work done. After hours of effort, the end is in sight. Then disaster strikes: "Sorry, a system error occurred." With a sinking feeling, you realize that you were concentrating so hard on creating the document that you hadn't saved your work for several hours. Screaming at the computer is not going to help. What could have helped is AutoSave II, a straightforward program that saves your work automatically at specified intervals.

Installing AutoSave II is simple; it's a cdev and INIT file, so you just copy it to the System Folder and restart. You set its operations through the Control Panel DA (see "Safety Command"). AutoSave II then sends a ⌘-key combination to the application you're in at a timed interval that you specify, from 1 to 999 minutes. You're not limited to just the ⌘ key; you can also send key commands that include the Option, Shift, or Control keys, in any combination. Some programs, such as HyperCard and many databases, don't have save commands because they save every time you enter a record. AutoSave II lets you specify up

to 50 applications to either include or exclude from autosaving. If you want the autosave feature in most, but not all, of your programs, you would exclude the programs you want AutoSave II to ignore. On the other hand, if you only need autosaving in a few programs, it would be best to include these programs. You can temporarily disable the program by clicking on the Sleep button, which cancels autosaving until you restart.

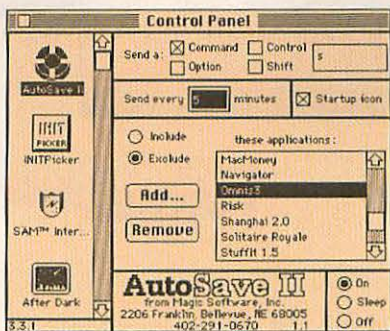
You can also use AutoSave II to do some specialized tasks within an application. Because you can tell it to type virtually any ⌘-key combination, you can use it to trigger any function that has a ⌘-key equivalent. And that function will repeat periodically; so you can use it, for example, to have a telecommunications program check your electronic mail.

Compatibility is excellent. I had no problems with INIT conflicts after installation, and the program worked well with a wide range of applications. If an application is busy when AutoSave II sends the Save command, the save commences as soon as the application is free. The program works so unobtrusively that I quickly forget it is installed. However, I was glad to have it running when I was switching between several programs under MultiFinder and my Mac froze up on me while writing this review. Thanks to AutoSave II, I didn't lose any work.

AutoSave II has two small shortcomings. First, it can't trigger macros in QuickKeys or Tempo II, so you can't use it to initiate those programs' more powerful capabilities. It also can't exclude individual desk accessories from the autosave list. You either have to let it work in all cases, or, if you're running MultiFinder, exclude all desk accessories by excluding the DA Handler. It would be nice if AutoSave II could send different ⌘-key combinations depending on which application you're in. You can only specify one keystroke setting for all programs.

AutoSave II is a utility that's so useful, it should have been built into the Macintosh system software. It's easy to use, inexpensive, and works very well. Best of all, it protects you from your own absentmindedness and safeguards your work. —Tom Negrino

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### Safety Command

This cdev sets the length of time between automatic saves, as well as which key combination to send.



# The Story Of Apple® & Eve.™

**I**n the beginning, there was an Apple. & a lot of software. Great stuff to use. Great stuff for pirates to copy free.

Then came a bigger, more powerful Apple called the Mac. The temptation for free software rose once more. & piracy again had its way.

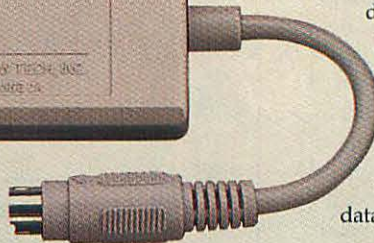
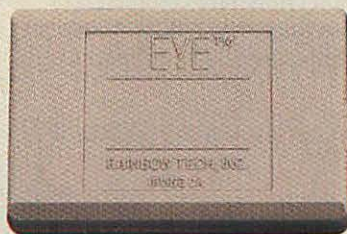
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EVE protects Macintosh software from piracy—with a simple but virtually foolproof concept: The software won't run unless the EVE hardware key is plugged in. And only those who purchased the software have a key that works with the program.

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Desktop Publishing Utility

## PARTNER 1.01

**Pros:** Saves steps bringing graphics into supported programs; simple to learn and use; consolidates graphics files within a single word processing or desktop publishing document. **Cons:** Operation can be erratic and slow. **Company:** Salient. **Requires:** Mac Plus; 2MB of RAM; System 6.0.2; MultiFinder. **List price:** \$99.



Incorporating graphics into word processing or desktop publishing documents can be time-consuming. You have to open your graphics program, draw your image, copy to the Clipboard or save to disk, switch to your word processing or DTP program, and then paste or import the graphic into your document. And you must repeat these steps whenever you modify an illustration.

Enter Partner, a new utility from Salient that makes moving artwork between graphics and word processing and DTP programs a one-step operation. It works with most popular programs: MacWrite II, Microsoft Word 3.0 and 4.0, Aldus PageMaker, QuarkXPress, MacDraw, MacDraw II, Canvas, FullPaint, MacPaint II, SuperPaint, Adobe Illustrator, Illustrator 88, Aldus FreeHand, and so on. You must have enough memory for both the graphics and text programs to run concurrently under MultiFinder, because Partner won't run without MultiFinder.

### Managing Graphics

Partner is an INIT that adds its own menu to the application. It offers several commands in word processing and desktop publishing programs; graphics programs get a much simpler menu (see "The Partner Menu"). For convenience, you can customize Partner's menu so it shows only the programs you have, and you can assign hot keys to every menu item.

You can create a new graphic for Partner to paste into your document; you can use Partner's Place command to import a graphic that you've saved from one of the supported graphics programs; or, once the graphic is in your document, Partner allows you to edit the graphic in the application

that created it and update the graphic in your word processing or DTP document.

### Making a Graphic

To create a new illustration to add to your document, you select the graphics program from the Partner menu. Partner finds and automatically loads the program and creates a temporary file, in which you draw your illustration. When you've completed the drawing, you use the Update command from the Partner menu in the graphics program to return to your word processing or DTP application. When you leave the graphics program, Partner deletes the temporary file.

Partner automatically pastes the graphic into Word or MacWrite II. In QuarkXPress, Partner pastes the graphic into a graphics box. In PageMaker, Partner acts like the Place command and positions the graphic wherever you click the mouse.

You can also use Partner's Place command to bring any saved graphic file from a supported graphics program into your document.

As long as the graphics application used to create a file is on your Mac, Partner can place a graphic saved in the graphics application's native format, so you don't have to save in PICT or EPS format. When Partner places a native-format graphic file, it loads the graphic into the application that created it, copies it to the Clipboard, then returns to your document, where it automatically pastes the graphic (or, if you're using PageMaker, allows you to place it).

Once you have an illustration in your document, it's easy to modify. You select the graphic and then choose Edit Graphic from Partner's menu. Partner automatically loads the program that created the graphic and pastes the graphic into a temporary file. You can modify the picture, then have Partner paste the edited graphic back into your document.

With MacPaint, MacDraw, SuperPaint, FullPaint, or Canvas, Partner uses the Cut and Paste commands and the Clipboard. Anything you copy to the Clipboard from these programs will be converted to PICT format when you move from application to application under MultiFinder.



### The Partner Menu

Applications that Partner has located on this Macintosh are shown in outline type. The Edit Graphic command automatically loads a selected graphic into the application used to create it.

With PostScript-based Adobe Illustrator and Aldus FreeHand, Partner has a few tricks. To move an Illustrator graphic, Partner attaches Illustrator's Encapsulated PostScript format to a PICT graphic in the Clipboard. Partner then pastes this combined PICT-EPS file into your document. Partner can also reverse this conversion by extracting the EPS file from the PICT file whenever it brings the graphic back into Illustrator to be edited.

Aldus FreeHand doesn't use EPS as its native file format. To bring a FreeHand graphic into your document, Partner first has FreeHand copy the graphic to the Clipboard in PICT-EPS format; it then adds the illustration's native-format information and pastes it into your document. Because Partner saved the native FreeHand information, it can easily be copied back into a temporary FreeHand file whenever you want to edit the illustration.

### Some Letdowns

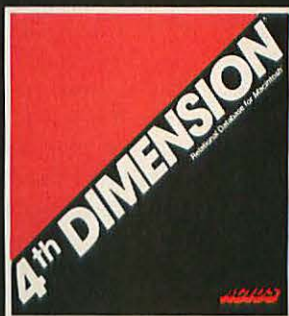
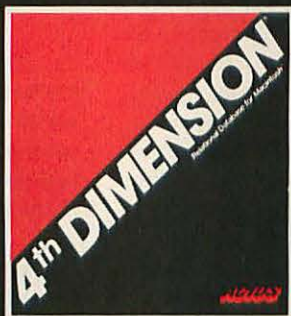
There are a few problems with Partner, however. It's often slow when moving large graphics, particularly FreeHand or Illustrator files. Sometimes Partner gets hung up while moving from application to application. These irritations are more pronounced when you have several INITs loaded. In version 2.0, Salient plans to let you link to separate graphics files.

On the whole, Partner's strengths outweigh its weaknesses. Although its sluggishness can be annoying, I found it far more convenient than using the Clipboard. I particularly appreciated how easy it was to edit a graphic that Partner had already placed in a document. (continues)



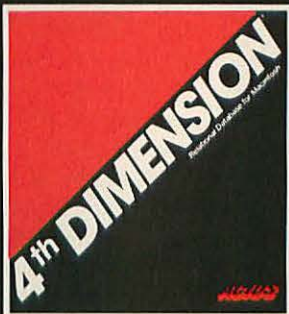
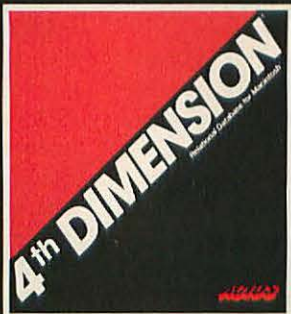
# Which Database?

4th DIMENSION now offers the easiest-to-implement relational capabilities; its overall functionality and programming capabilities may make it the first real Macintosh database standard.  
**INFOWORLD, September 1989**



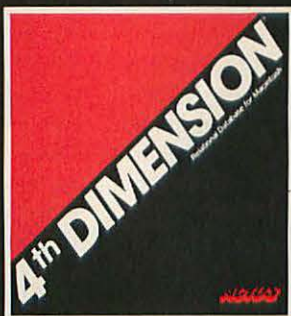
4th DIMENSION outshines all the other databases with its number of features and rich database development environment (...). Of the current programs, 4th DIMENSION is the most complete and powerful.  
**BYTE, January 1990**

Given that 4D was the first program to allow database designers to build a Macintosh interface, Acius has the advantage of experience over its competition.  
**MacWEEK, June 1989**



ACIUS has created a rich environment for database users at all levels.  
**MACWORLD, January 1990**

4th DIMENSION 2.0 is a rare treat (...). You really can create powerful multifile database systems without getting involved in coding at all.  
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ment. I didn't need to remember which application I had used to create the illustration, or the location of the original file—Partner handled all that for me. FreeHand fans accustomed to keeping track of two files for every illustration (FreeHand's native file and an exported EPS file) will enjoy Partner's one-step simplicity. —Eric Taub

See Where to Buy or circle 784 on reader service card.

★

Idea-Generating Software

## IDEAFISHER 1.0

**Pros:** Comprehensive content and clean implementation. **Cons:** Takes up nearly 7MB hard disk space; interface suspiciously PC-like. **Company:** Fisher Idea Systems. **Requires:** Mac Plus; 7MB hard disk storage. **List price:** \$495.

## MINDLINK 1.0

**Pros:** Easy-to-navigate HyperCard stack; nice array of idea-generating scenarios; ships with cool bag of toys. **Cons:** Occasionally too cute. **Company:** MindLink. **Requires:** Mac Plus; hard disk; HyperCard 1.2.2. **List price:** \$499.



You are desperately in need of a muse. It's finally time to bite the bullet and name that new brand of flea powder or flesh out the plot of that sci-fi novel you've been threatening to write. But you're fresh out of inspiration. Where to turn?



Well, you might consult MindLink from MindLink, Inc. or IdeaFisher, from Fisher Idea Systems, two Mac applications that profess to be idea generators. Both programs include techniques intended to enhance creativity, but that's really where the similarity ends. One employs the Socratic approach, the other belongs to the Roget (as in Roget's Thesaurus) school of associative thought.

### MindLink

The MindLink HyperCard stack presents you with a spiraling series of nested questions and activities, each linked to a scrolling text box into which you record your responses. The opening Hello Card allows you to choose whether you want to explore the Gym,

Idea Generation, Guided Problem Solving, or Problem Solving components of the application.

The Gym is described as a "series of mental workouts" that are designed to "relax your self-censor." You might be asked to list the ways in which you could use a pin; if that object is uninspiring, you can click a button to call up other objects—a mouse or a rock, for instance. In the Stretched Idiom exercise, you are asked to describe common sayings ("painting the town" or "dawn breaking"); oxymorons ("pretty ugly"), and some downright Zen phrases ("the view inside a grain of sand"). Other typical exercises involve building associations between random words or improvising vignettes based on ten diverse words of your own choosing. Many of the questions you encounter relate to the problem at hand; others are wild cards meant to free up your creative spirit. ("Absurdity is not irrelevant," you are reminded during one exercise.)

The Idea Generation section includes scrolling fields into which you record the name of your problem, its description, and ideas about the problem (see "MindLink"). The Trigger button might lead to a poem or a scanned photo, each accompanied by the ubiquitous scrolling field awaiting your comments. If you opt for Guided Problem Solving, the program chooses the route through the questions and suggested activities. The Problem Solving section puts you in control of the process, offering Wish, Idea, Build, and Solution worksheets along with access to many other exercises.

All in all, MindLink is an easy-to-navigate stack that gently urges the user to probe beneath the surface,

presenting a program of action that takes its cues from the many current theories on creativity (the manual outlines several of these). Its success as a digital muse, however, is entirely dependent on the user. Some will find its queries inspiring; others will be annoyed by its sometimes cloying tone. (At the end of one lesson, if you "click for a treat" you end up with a card that reads, "Imagine smelling a sweet deep red rose," with an escape button named Ahhh.)

### Idea Fishing

IdeaFisher is in a very different league. "We supply the facts," the application boasts, "you supply the smarts." More than 60,000 words and phrases are interlinked within 28 Major Categories and 386 Topical Categories. In addition, you have access to more than 3000 Problem Solving Questions broken into three divisions—Orient-Clarify, Modify, and Evaluate. I can't help believing the creators when they say that they spent ten years compiling this extraordinary compendium of associations. The application takes up nearly 7MB of storage space, for crying out loud.

Although there are many ways to enter the application's labyrinthine inner workings, let's look at one scenario that illustrates the potential of the product. If you choose the Orient-Clarify option from the QBank menu, you are presented with a sequence of questions. Does your problem relate to a story idea, the naming of a product, the development of a new service? Click on the text line that best describes your concern, and a new series of questions appears. If you type *(continues)*



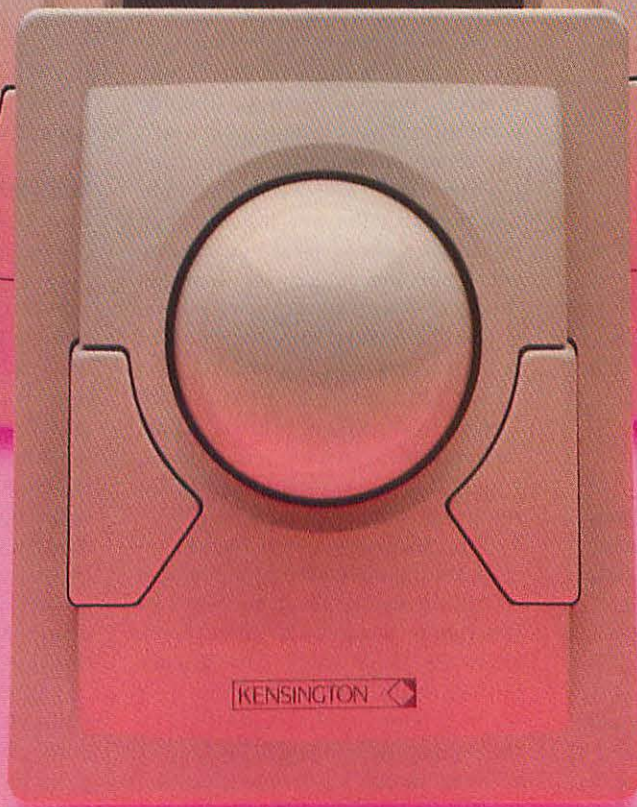
**Bag of Tricks**  
MindLink comes complete with a set of objects to help trigger creative thought.

MARK JOHANN





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**1989 Macworld  
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**1988 Macworld  
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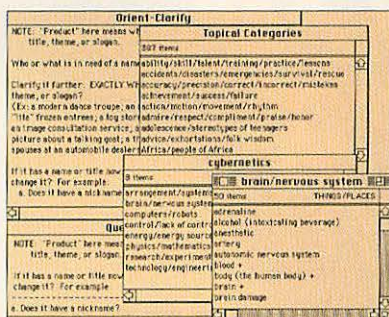






#### MindLink

The main Problem Solving window in MindLink records the comments you make in any of the four Worksheet modes.



#### IdeaFisher

Double-clicking on any of the words or phrases in any of these IdeaFisher windows brings up still more sets of associations.

an answer to a specific question, both query and answer appear in the Question Notepad which can later be printed out. After generating a body of responses, you can check the Key Concepts window for an indexed listing of the words or phrases in your responses that match words in the program's databank. You can then select the terms that you would like copied into your Idea Notepad.

#### Enticing Options

If you double-click on one of the terms in the Idea Notepad, you enter the associative mode (see "IdeaFisher"). It is at this point that you must begin to exercise discipline. The numbers of options are enticing and each double-click opens new semantic vistas. Remember those 28 Major Categories and 386 Topical Categories? They add up to over 700,000 cross references. Before you know it *subliminal advertising* leads to *cult follower* which points to *refusenik* and you end up with *court jester*. Because each double-click opens up another window, the desktop is soon littered with overlapping lists of interrelated terms. This

open-endedness sounds chaotic and it is—unless the user is diligent and focused. The fecundity of the program provides rich loam for brainstorming and there will be those who are able to coax million-dollar ideas from its thousands of clever synonyms. Others, like myself, who find amusement in perusing a dictionary or thesaurus, will be seduced by IdeaFisher's unique and thorough groupings and links and will no doubt forget the point of the quest.

#### New Vantage Points

Just as electronic music and paint programs do not make artists of us all, neither MindLink nor IdeaFisher will engender genius where only static ruled before. They can help us to freshen our world views and to attack problems from new vantage points, however. MindLink will suit those who want an amiable guide and who are willing to approach problem-solving as though the task were an essay test. IdeaFisher is certainly the more comprehensive (and expensive) of the two, and professional idea mongers are advised to start with it. —Suzanne Stefanac

See Where to Buy or circle 758 (IdeaFisher), 779 (MindLink) on reader service card.

#### Color Arcade Game

### SOLARIAN II

**Pros:** Great action and sound effects; challenging and addictive.

**Cons:** No custom keystroke assignment; only 8-bit color support; minor bugs. **Company:** Stick Software.

**Requires:** Mac II; 2MB RAM; 8-bit color.

**List price:** shareware, \$25 requested.



One of the Macintosh's nicest features is its shareware library. I remember the first time I booted up my new hard drive and found 10 megabytes' worth of public domain software residing there. Some of the games—including *Dungeons of Doom*, *Scarab of Ra*, and *Klondike*—I still play today.

Recently a shareware game called *Solarian II* was released that has all of the better elements of *Crystal Quest* and plays like the arcade favorite *Galaxia*. *Solarian II* is an arcade game in



#### Stage 9

You must gun down the supply ship to get your supplies. (The background color was changed for clarity.)

the style of *Space Invaders*: swarms of creatures fire and dive at your space ship, which maneuvers across the bottom of the screen and fires back; every time you hit a creature it dies, and when you clear a swarm of creatures you move to the next level. Each wave of creatures is different, and the behavior of each creature is unique.

During each wave your supply ship crosses the top of the screen and drops off needed supplies. If you retrieve the supplies you receive bonus points and increase your chances of making it to the next level. You have at your disposal guided missiles, lasers, and ray guns. You also have a protective shield, but its powers are depleted if you fail to retrieve your supplies.

#### Power User's Lunch

*Solarian II* is not for everybody. It only runs on a 2MB color Macintosh. You can't modify the key placement, and the program doesn't properly reset the color and sound when you quit. When you want to reset you have to go to the Control Panel. I also thought *Solarian II*'s documentation could be more helpful, but these are all minor defects.

I really like this game. The action is furious, unpredictable, and challenging, in the classic arcade-game style. It's just the thing for putting a smile on your child's face or for practicing stress management during the lunch hour.

*Solarian II* is available from online services, certain public domain libraries, and the author himself. Just send a disk to Ben Haller, Stick Software, 32 Deerhaven Dr., Ithaca, NY 14850—and don't forget to include return postage and \$25. —B. A. Sosinsky





If that sounds like an outrageous statement, it sure is.

But then, this is one outrageous set of utilities.

In fact, comparing the Norton Utilities® for the Macintosh® to anybody else's utilities for the Macintosh is, well, kind of embarrassing.

Because when it comes to fixing your disk problems, rescuing your data and daily getting the utmost from your Mac®, nobody else even comes close.

### Why you need a Doctor in the house.

To see what we mean, see what happens when you call up our revolutionary *Norton Disk Doctor*®.

Which is what you'll do whenever you're having trouble doing things like booting your system, recognizing or reading disks, opening, closing or trashing folders, locating icons or launching applications.

Instead of displaying something like "Sorry, unable to repair" and sending you to the service center, the Disk Doctor determines the exact nature of the problem, reports it and, in most cases, fixes it for you.

All by itself.

In fact, the Disk Doctor

automatically diagnoses and repairs the 45 most common—and dangerous—problems your disk can confront you with.

Including a whole bunch of things the other guys can't even detect, let alone repair.

Which is one reason why—unlike other programs—we don't display hair-raising messages warning you of the "Risk of losing data" from using our utilities.

### We save your trash.

Of course, any time a human being

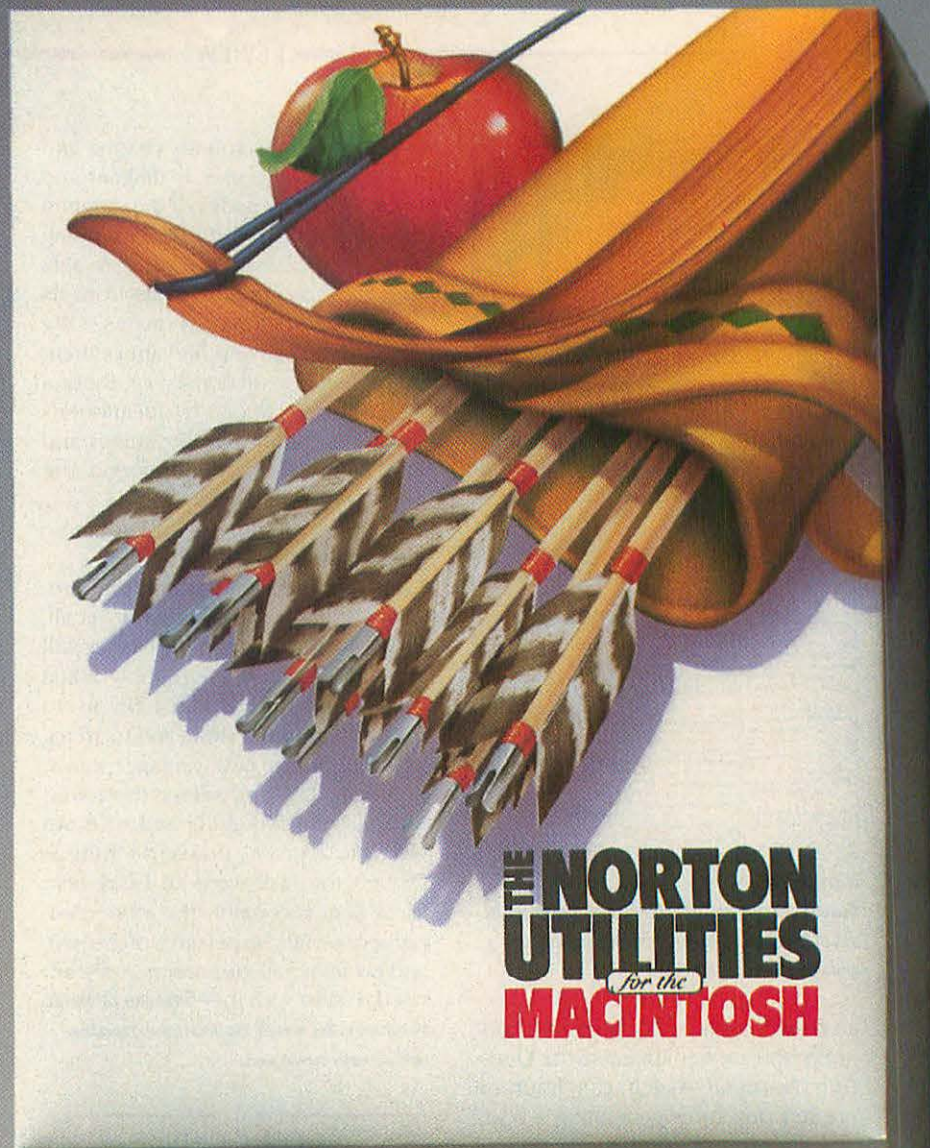
uses a computer—yes, even a Mac—there's a risk of losing data.

Which is why, seven years ago, Peter Norton Computing invented the legendary *UnErase*®.

Like the rest of the tools in this box, UnErase has been designed expressly for the Mac, to recover more kinds of trashed files, more quickly and with less effort on your part than any other program.

Instead of just one level of data recovery, we give you three.

You can UnErase by File Type.



→ We rebuild your reformatted hard disk in a mere nine seconds. That's 52 times faster\* than the "competition."

\*Total times to recover a reformatted 40MB Quantum® internal hard drive on a Macintosh IIcx with respective volume information files installed.



# Any resemblance to other Macintosh utilities is pure coincidence.

By Text Search. Or use *Quick UnErase* to scan your fully loaded hard drive in as little as five seconds. (You don't even want to know how long it takes everybody else.)

Whether your drive is fully loaded or nearly empty, *Speed Disk*™ is—here we go again—the quickest, easiest and safest way to dramatically accelerate disk access.

And unlike other programs, *Speed Disk* won't lose your data even if your Mac loses power.

Speaking of losing data, when it comes to losing large quantities of it quickly, nothing compares with accidentally reformatting your hard disk.

And when it comes to unformatting your hard disk, nothing compares with our *Format Recover* and *FileSaver*.

Together they not only let you resurrect 100% of your data, they do it in a tiny fraction of the time it takes other programs.

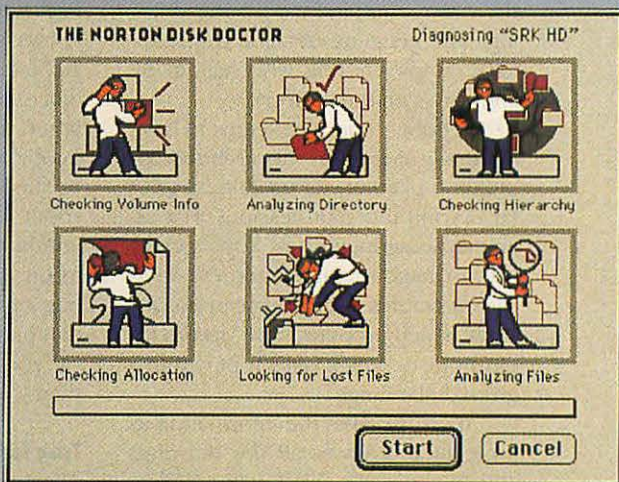
## What a find.

Of course, you don't have to lose your data to want to get at it as quickly as possible.

That's something you want to do every day, every time you open a file.

So you'll be interested to know that *Fast Find* locates and opens files so quickly, you may never use the Mac's standard Find File desk accessory again.

But you'll use our accessories



*The remarkable Norton Disk Doctor automatically diagnoses, reports and repairs the 45 most common—and dangerous—disk problems. It even tells you when it's time to run our Speed Disk utility and optimize your Mac's performance.*

and control panel devices daily.

If all of this looks too good to be true, see your favorite software dealer for a demonstration.

If you haven't got a favorite software dealer, call us right away at **1-800-365-1010 Ext. 523.**

We'll send you more information.

**Peter Norton**  
COMPUTING

Circle 141 on reader service card



★  
Visual-Information Manager

## APERTURE 1.05

**Pros:** Extremely accurate drawing; associates data with objects in a drawing. **Cons:** Can't calculate areas in drawing; can't use data from records to make calculations in report mode.

**Company:** Aperture Technologies.

**Requires:** Mac Plus; hard disk; System 6.0.3. Mac II; 2MB RAM; color monitor recommended. **List price:** \$795.



Aperture, with its 2-D CAD program and database manager working together, links textual and numerical information to objects in a drawing. When designing an office facility, you might draw all the furniture, even the Macs. You could then associate information about the office equipment with the drawings and generate detailed reports—for example, noting who has an SE and who's on the network.

Although Aperture seems to have been designed for the architect or building planner, its usefulness goes far beyond those professions. For example, someone in New York is using it to manage rental properties: Aperture generates a map that can quickly show which properties are vacant, for example, or which ones rent within a given dollar range.

Aperture saves the information as projects and stores all the drawings and database files relating to a project in the same folder. This lets you quickly link drawings together and associate data with objects.

### The Drawing Program

There is a steep learning curve associated with Aperture, but it's worth the time and effort. The drawing part of the program uses a mouse-up drawing technique: you click the mouse button once to mark one end of a line and then click again to mark the opposite end. Between those two clicks, you can zoom to a different scale, move to another part of the drawing, even consult a different drawing—do virtually whatever you want.

When you select a drawing tool from the palette (which can display horizontally or vertically), a new menu

appears that provides different ways to use the tool. For example, instead of clicking on an end point to define a line, you can specify the direction and distance (in anything from microns to miles) to define the second point.

You have similar control of all the drawing functions. You can nudge an object .001 inch or move it 2.34 miles, depending on the scale you've selected. Circles, arcs, rectangles, curves, and polygons can be constructed and positioned with great accuracy using an edge, a center, or a vertex. Dimension lines can be added by clicking at both ends of the object you want to measure. You can display up to 256 colors on up to 255 layers. And you can store objects in a symbol library for future use.

Perhaps the best demonstration of the program's power is its ability to zoom a drawing up to 30 million times. For example, one of the tutorials shows a floor plan of an office that is 100 feet by 55 feet. Displayed in one office on that floor plan is a Mac SE. When you zoom in on the SE, you see a copy of the same floor plan displayed on the Mac's 5-by-7-inch screen. If you zoom in on that floor plan, you see another SE in the same place. Zoom in on that computer, and you see a bug on the upper-left corner of the computer's screen. If you wish, you can zoom in on the bug until it is larger than your computer screen.

### Tying Your Project Together

Aperture's database lets you associate different types of information with a drawing and offers different types of reporting capabilities. In the tutorial, information about office equipment and personnel is associated with the office floor plan. The program can

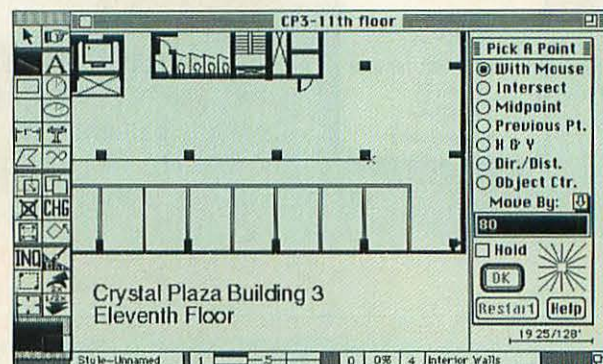
generate a detailed report that shows every record in a file, or a summary report that groups similar types of data into a single line entry. For example, in generating a report on all the computers in your office, the detailed report would list each of the 15 Mac SEs, 25 Mac IIs, and 3 LaserWriters individually, while the summary report would only show three lines, one for each type of machine.

Aperture's database functions seem rather basic, but the program's strength lies in binding information to drawings. Although you can't, for example, multiply one data entry by another, you can use the database function to select data objects in a drawing. Using the database function, you can highlight all Macintoshes in your office that have more than 2MB of memory or all that have been repaired in the last year.

Aperture's documentation is easy to understand and includes examples of every command, but most helpful is the tutorial, which demonstrates by example all of the program's features. Unfortunately, you can only run the tutorial on a Mac II. Aperture also has a help function, but it serves best as a reminder; if you didn't read in the manual how to perform an operation, the help function won't help.

I was impressed by Aperture. If drawings are key to your business, I would recommend it. It's a good CAD program, and its ability to associate data with drawings makes it uniquely useful. Despite a few missing features, such as the capability to automatically calculate areas in drawings and to manipulate record fields using mathematical calculations, Aperture is still an excellent value.—**Brooks Hunt**

See Where to Buy or circle 709 on reader service card.



### Office Floor Plan

This is a drawing of a typical floor plan that Aperture associates with a database of equipment.



# The Industry's First One-Year Guarantee

## *Times have changed, and so have hard drives.*

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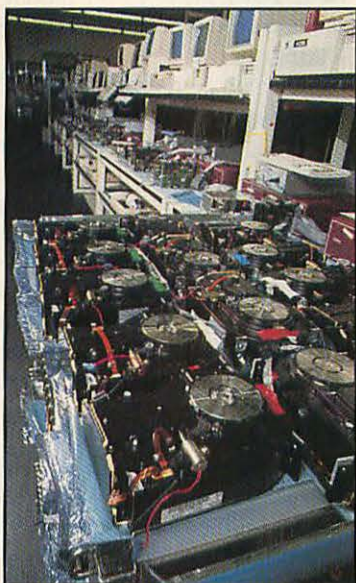
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As a special feature, the software allows unusual partitioning flexibility, allowing spanning of drives with partitions—a partition may span over more than one drive—as well as multiple partitions per drive.



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Our specialists provide the kind of service you can get only from a company that makes their own drives.

You need to know the difference between a box-stuffer and a manufacturer. A box-stuffer cannot repair your drive because they did not manufacture it themselves.

But at Priam, we make our own drive mechanisms. That's the difference. And

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***Our drives are designed to meet the performance demands of the new Macintosh IIx and software such as A/UX 2 and Aldus Pagemaker 4.0.***

The fast 18ms seek time, large 300MB capacity and proven dependability of the Priam 300MB MacDisk II make it well-suited to the increasing complexity of the applications of today and tomorrow.

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★  
Network PackageNETWORK BUNDLE  
FOR MAC 3.0

**Pros:** Now supports multiuser databases; low cost; includes electronic mail suitable for small groups (fewer than 20 users); very reasonable site-upgrade cost for larger sites. **Cons:** Still uses its own DA for mounting volumes; electronic mail for larger groups requires a second, separate program. **Company:** TOPS. **Requires:** Mac 512KE; network cabling and connectors. **List price:** \$299 (site upgrade \$125).



As one of the original file servers for the Macintosh, TOPS has been around for quite some time. Functioning as a distributed file-server system (one that does not require a dedicated server) for both Macs and PCs, earlier versions of TOPS have been both popular and effective networking solutions, especially for small workgroups.

Past versions, however, have had their share of problems, mainly with corruption of large database files when using Ethernet, as well as with TOPS' lack of support for Apple's shared environment extensions. With the release of version 3.0, TOPS has both dealt with the software's problems and expanded its network package to include TOPS file-server software, TOPS Spool print-spooling software, TOPS Translators, and InBox.

## Something Old, Something New

The TOPS file server is a distributed file-server system, which means that you don't need to devote a computer to act solely as the file server (as you do with AppleShare 2.0.1). As in the past, you use a desk accessory to decide which folders or disks you want to publish or make available to other

users on the network. Other networked users can then use their copy of the TOPS desk accessory to see which volumes are available on the network, and then mount the desired volumes on their computer as if they were locally attached disks. You can have TOPS publish and mount the same volumes whenever you start your Macintosh.

One problem with TOPS in the past was its lack of support for the file-locking and byte range-locking mechanisms, often referred to as the shared environment extensions, that Apple implemented in its AppleShare server software causing problems with certain multiuser databases (FoxBase+/Mac, Omnis 3 Plus, Omnis 5, 4th Dimension, FileMaker II). With version 3.0, TOPS now supports the shared environment extensions.

TOPS 3.0 does not, however, implement the specifications of Apple's AppleTalk Filing Protocol (AFP), which deals with the representation of protected folder icons on the desktop and access to AFP servers via the Chooser. This means that a TOPS user must still use the TOPS DA to mount TOPS volumes, and the Chooser to mount AppleShare volumes.

## Network Utilities

The TOPS Spool now supports the LaserWriter and Laser Prep 6.0 files. As before, TOPS Spool operates in the background, letting you work on other projects while a job is being printed. TOPS Spool only works with laser printers and does not support the ImageWriter, ImageWriter II, or ImageWriter LQ.

MacLinkPlus/TOPS, the TOPS Translator package now officially the same as the MacLink Plus translators from DataViz, is a stand-alone application accompanied by a file of the translation codes. MacLinkPlus/TOPS works

only if TOPS has been installed on the Macintosh.

## Bundling In Mail

New to the TOPS Network Bundle is the inclusion of InBox 3.0, which allows you to set up an E-mail system of up to 20 users and can be used either as a mail-server message center (using only the AppleTalk protocols) or as a file-server message center (using networking software, such as TOPS or AppleShare, as well as the AppleTalk protocols).

The Mail-Server configuration is easy to install and use, but is restricted to Macs only—you can also dedicate a Mac to this system for efficient operation. On the other hand, the File-Server configuration can be installed on many different types of file servers, such as an IBM PC or Sun workstation, but is a bit more difficult to use, as you must mount the server's volume in order to use the mail system.

If you need a larger E-mail system, InBox Plus (purchased separately) allows you to set up communications between numerous InBox message centers or between more than one LAN. Each InBox Plus message center supports up to 100 users.

## Your Money's Worth?

TOPS has been and continues to be a good introductory tool for file sharing and printer spooling over a network. Even for a workgroup of six to eight people, TOPS is more cost effective than AppleShare, since you won't have to set aside a Mac to function as a file server.

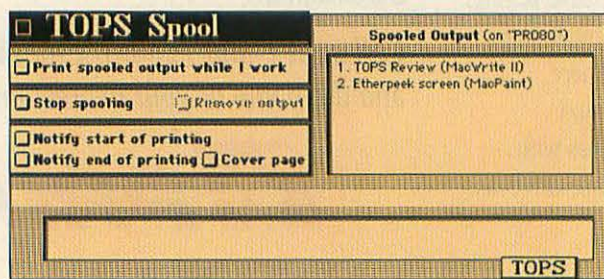
However, as a workgroup grows (for instance, to ten users or more), it's inevitable that you will have to install TOPS on a dedicated Mac for best performance. At that point, even with the addition of E-mail to the Network Bundle as an added value, TOPS becomes more expensive than AppleShare.

If you're just setting up a new network, consider the size of your group before you choose between TOPS and AppleShare. If you're upgrading an existing TOPS network, TOPS' upgrade policy is mighty hard to resist—\$125 per site buys you the entire Network Bundle, including InBox.—**Dave Kosior**

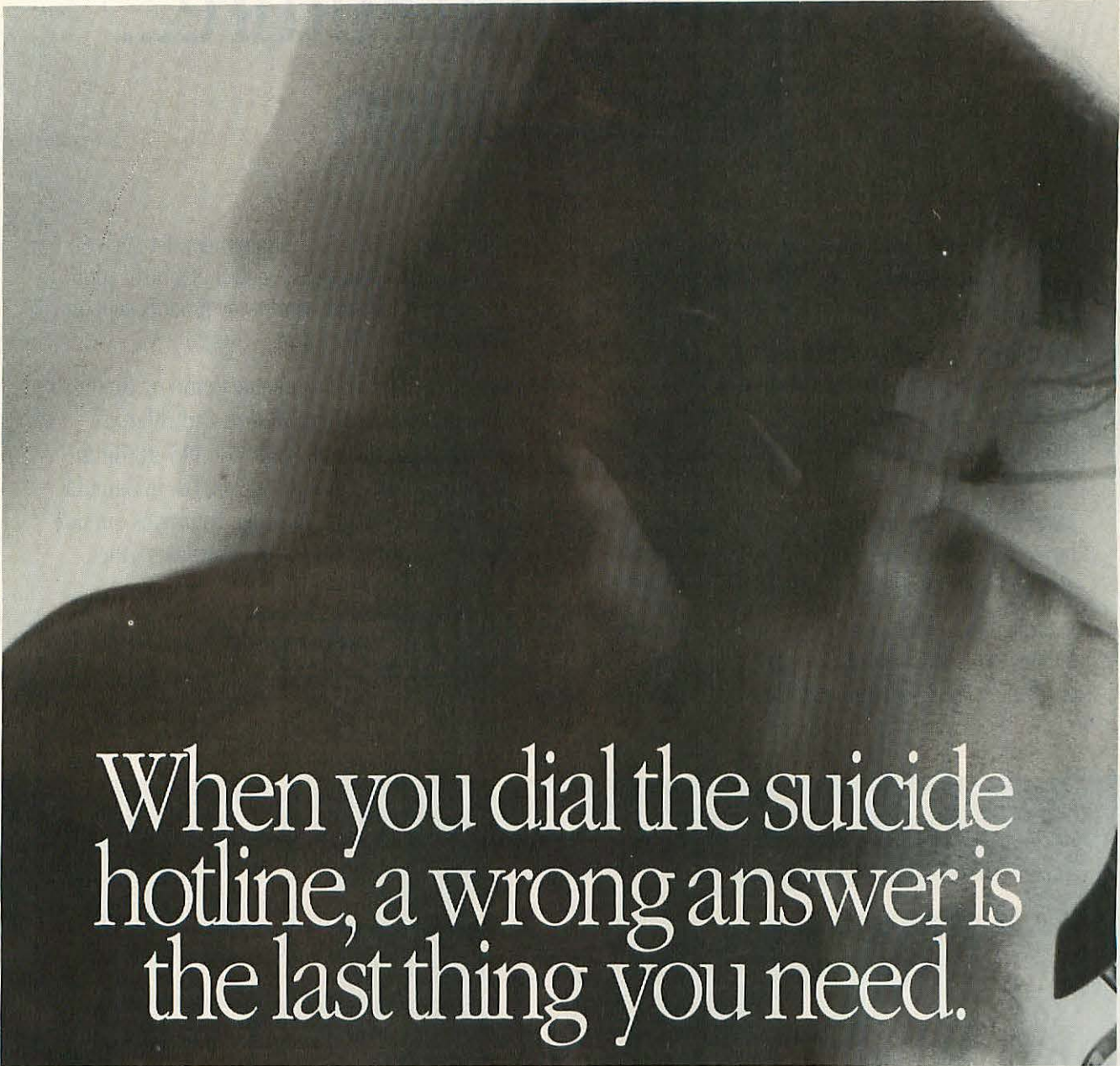
See Where to Buy or circle 782 on reader service card.

## Print Service

The print spooler included in the Network Bundle can be accessed via a desk accessory: you can change the order of print jobs, delay them, or delete them from the queue.







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# WINDOW SHOPPING

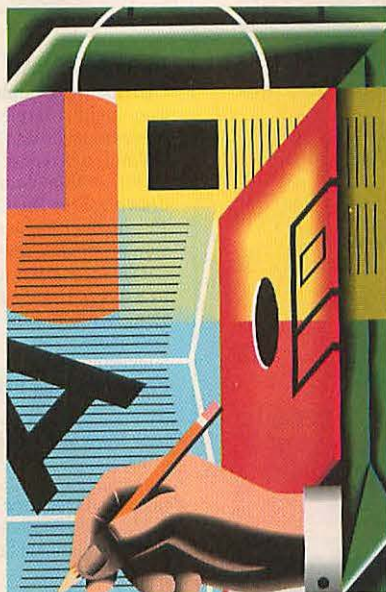
by Lawrence Stevens

*This month I review a potpourri of applications to help you start and run a business: a stack to evaluate the business's viability, a template set for business stationery, a guide to writing better English, and a Mac-cleaning kit.*

## HyperEntrepreneur 1.1

Recently a friend who has worked for 20 years as an electrician and supervisor at a major corporation told me he is considering giving up his excellent salary, nice pension, light work schedule, and generous vacation time in favor of running a doughnut stand in downtown Boston. "I've always wanted to own my own business," he offers as the only reason for leaving a secure job that he admittedly likes, to engage in a risky enterprise that he knows nothing about. It seems that next to owning a home, being an entrepreneur runs second as the epitome of the American Dream. I've been bitten by the bug a number of times myself, causing me to launch three poorly conceived and laughably undercapitalized businesses.

While many businesses are wildly successful, the vast majority go under



in their first year. Not all ventures are viable, and not all would-be entrepreneurs have the temperament to be on their own or the skills needed to run a company.

HyperEntrepreneur (\$285 from Hyper Train) offers a painless, even pleasant, way to test your business idea and your skills. It also helps you plan the specific steps needed to get started.

This 3.5-megabyte HyperCard stack, chock-full of playful animations and sound effects, walks you through 16 instructional modules (see "Learning about Your Business"). The instructional information ranges from determining the type of business for you, to outlining your goals, enumerating the needed skills, assessing the risks, and even selecting a name.

Each module begins with a tutorial, moves on to examples, and ends with a worksheet in which you apply what you've learned to your proposed venture. For example, after you've completed the business activity section in the Main Activities module, you

move to the worksheet in the Running Your Business module to consider when the activities will be done and by whom. The Do I Have Skills module requires you to place each business activity in one of four categories: those for which you have the skills; those that require skills you can learn; those for which you know a source who can provide the skills; and those for which you are at a loss to know who can provide the skills. Unless you discover who can provide the skills listed in the last category, the proposed business is not viable.

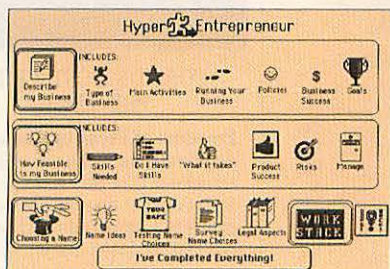
When you have worked your way through all the modules, the completed worksheets form an informal business plan that can be used as a guide for initiating and running your new company. The worksheets, however, are too informal to be used as a business plan to show banks or venture capitalists.

If you buy this program, beware of the Exit button, which is seriously flawed. Rather than simply closing HyperCard, Exit causes the Mac to shut down. Apart from this, HyperEntrepreneur is witty and easy to use. It can determine whether your business idea is viable and help you understand exactly what you need to do before hanging out your shingle.

## Layouts 1.0

Once you set up shop, your business will need stationery, business cards, and possibly brochures, newsletters, and flyers. Designing your own gives you more control than hiring a designer would.

If you have a working knowledge of PageMaker, an aptitude for design, and the time, you can create your own printed materials from scratch. But if you lack any of these, Layouts, a five-disk set of PageMaker templates (continues)



## Learning about Your Business

HyperEntrepreneur is divided into three sections: Describe My Business, How Feasible Is My Business, and Choosing a Name. You work through the modules consecutively. The last button, Work Stack, takes you to your set of activity cards, which you can print and use as a sort of business plan.



# Programs, Peripherals

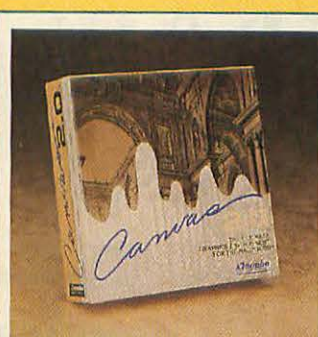


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<b>Kent Marsh</b> NightWatch v1.03.....	85.
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<b>MainStay</b> Capture.....	49.
Mac Schedule v2.0.....	149.
<b>Microcom Software</b> Virex.....	52.
<b>Microlytics</b> GDIer v2.0.....	45.
<b>Now Software</b> Now Utilities.....	89.
<b>ON Technology</b> On Location.....	75.
<b>Peter Norton</b> Norton Utilities.....	73.
<b>Software Innovations</b>	
HandOff v1.1.....	31.
HandOff II.....	SPECIAL 52.
<b>Solutions, International</b>	
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Super Glue II v2.01.....	61.
<b>SuperMac Software</b>	
SuperSpool v5.0 or Diskfit v1.5.....	58.
SuperLaserSpool v2.02 or Sentinel v2.2.....	87.
<b>Symantec</b>	
Symantec Utilities (SUM II).....	99.
Symantec AntiVirus (SAM).....	67.
<b>Synex</b>	
Mac Envelope v5.....	79.
Mac EnvelopePlus v2.0.....	219.
<b>WildFlower Software</b>	
SnapJot.....	32.

## Accounting

<b>Aatrix Software</b>	
Aatrix Checkwriter II v2.8.....	35.
<b>Absolute Solutions, Inc.</b>	
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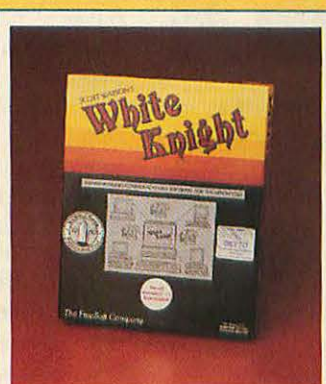
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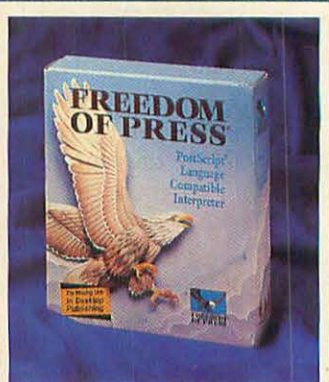
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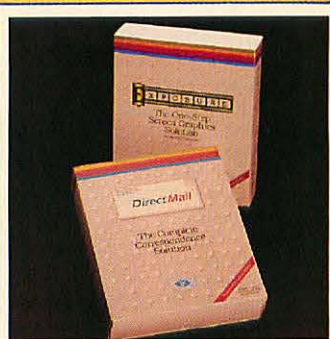
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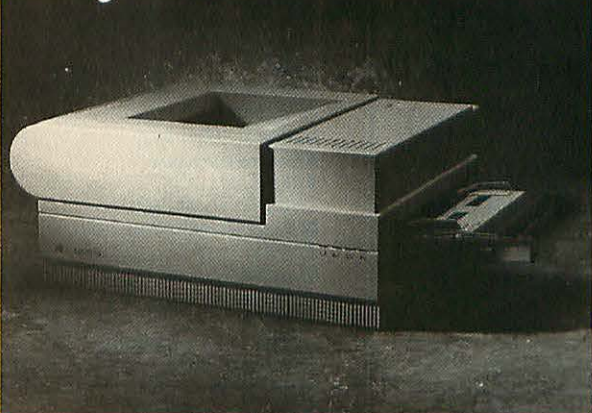
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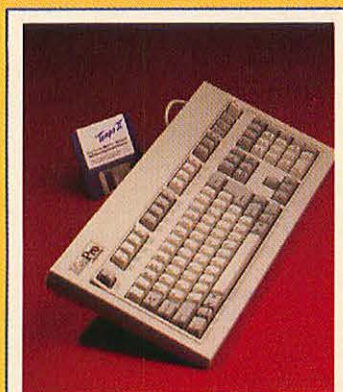


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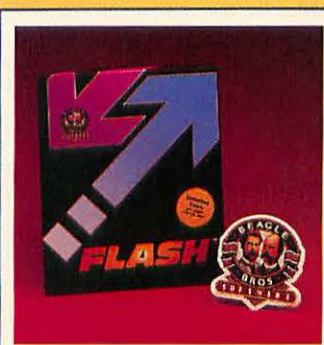
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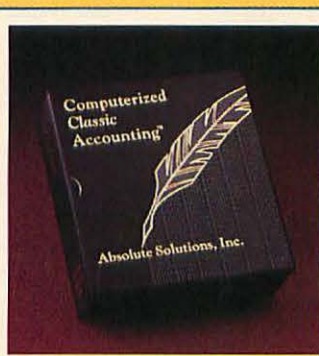
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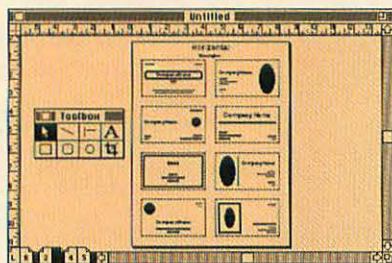
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### Take a Card, Any Card

Layouts offers a wide selection of business-card formats.

(\$179.95 from Starburst Designs) can get you started and finished quickly. The concise manual tells all: you'll be able to get by with only a glancing familiarity with PageMaker.

The business card template has 82 models (see "Take a Card, Any Card"). There are standard horizontal and vertical cards, cards that fold in every reasonable fashion (center fold, short-fold vertical, tent fold), single-sided and double-sided cards, and cards with attractive borders and other graphic elements. The letterhead template also provides dozens of different formats and locations on the page.

The brochure section also has dozens of formats, including designs that combine graphic placeholders and type in interesting patterns.

I wouldn't buy Layouts, though, if my primary purpose were to create either newsletters or flyers. The similarity of the 14 newsletter formats severely limits your choices. And the templates make no provision for text that continues from one page to another. While you might be able to use the one generic sale flyer, the other four are designed for the music, home-improvement, and travel industries.

Layouts' weaknesses in some sections are particularly noticeable next to the robustness in other sections. Even if you only create one business card and letterhead in your career, Layouts is well worth the price.

### American English Writing Guide 1.11

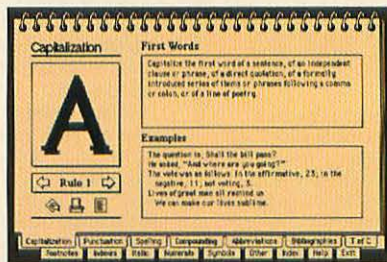
If you don't need a secretary to clean up your correspondence but do find yourself occasionally in a quandary, American English Writing Guide (\$49.95 from Nova Development Corporation) should be on your hard disk (see "A Guide to English").

In March I reviewed The Electronic

English Handbook from Technology Training Associates. I liked the fact that The Electronic English Handbook is a DA, which makes it easy to access while working on a word processor, and I found it comprehensive in that it provides all the basic rules for most of the topics covered. American English Writing Guide, being a HyperCard stack, lacks the compactness and easy accessibility of the DA, but it offers a lot more information. For example, while the 13 rules for commas in The Electronic English Handbook include every instance where a comma should be used, American English Writing Guide's 31 rules for commas also point out where commas should not be used. Also, where The Electronic English Handbook typically cites a rule in a terse sentence, American English Writing Guide is more likely to describe the rule in three or four phrases or even to separate the rule into sections and discuss each section on different cards.

American English Writing Guide also includes topics not covered in The Electronic English Handbook. Two notable examples are the Preferred and Difficult Spelling section, where you can look up hundreds of often misspelled words, and the Signs and Symbols section, which lists hundreds of symbols for such things as money, measurement, astronomy, chemistry, and geology.

The main problem with most on-line guides of this kind is that they must sacrifice information for compactness. This stack, which occupies half a megabyte of disk space, is almost as comprehensive as a reference book.



### A Guide to English

American English Writing Guide lists its instructions in two fields. The top field displays the general rule, the bottom field displays examples. You can move to other sections of the guide by clicking on the tablike buttons at the bottom of each card.


If you can spare about a megabyte of memory and half a megabyte of disk space, American English Writing Guide will prevent you from making embarrassing mistakes.

### CleanPath Computer Maintenance Kit 1.0

It's hard to keep track of when a Mac was last cleaned, especially if it's being operated by more than one person. The computer-controlled aspect of CleanPath Computer Maintenance Kit (\$59.95 from Discwasher) ensures that Macs are cleaned on schedule.

The kit contains materials for cleaning the disk drives, printer, screen, and keyboard. There are, of course, dozens of such computer-cleaning products on the market today, and because they all use isopropyl alcohol as their main ingredient, I assume that one is as good as another. What sets this system apart is that it tells you not only how to clean the Mac but when; you can set up a cleaning schedule for every 30, 60, or 90 days. You install the application as a start-up document under MultiFinder, and each time you switch on the Mac, the application opens and checks to see if today is cleaning day. If not, it closes immediately. On scheduled cleaning days, the program displays step-by-step instructions for cleaning the Mac and components.

If you don't use MultiFinder, you won't be able to use the automatic reminder feature. Just note the days on your calendar and open the application in the usual way.

I think CleanPath goes a bit too far, however, since it doesn't let you access the program before the set interval has expired; it simply won't open, even to let you change the interval. Actually, you probably will remember how to do most cleaning jobs after you've done them once. But you will still need the program for disk cleaning, since it has to spin the disk drive after you've inserted the cleaning disk. I expect that the CleanPath kit will help keep my machine clean. Now if Discwasher could only release a product to remind my son to clean his room. 

See Where to Buy or circle 757 (HyperEntrepreneur), 766 (Layouts), 707 (American English Writing Guide), 727 (CleanPath Computer Maintenance Kit) on reader service card.



# FOR DESIGN, SPEED AND PRICE, EVERYTHING POINTS TO MacTRAC.

MacTRAC™ fits beside your keyboard in less than 4 inches. And, unlike a mouse, it stays put in one spot. MacTRAC gives you back the desk space your mouse and mouse pad took away from you. Now, no mouse pad, no mouse rowing, no mouse cleaning.

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MacUser, Feb. 1990*

*"Fast and Flexible"  
Macweek, Jan. 1990*

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CORPORATION  
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212-719-2299

Circle 90 on reader service card





# NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

## HARDWARE

### Access CD

Macintosh subsystem that contains the Laser Magnetic Storage International CM231 CD ROM drive, SCSI cable and terminator, user guide, and device driver on a floppy disk. \$799.95. Optical Access International, 617/935-2679.



Access CD

### Accuvue 21-AP

21-inch autoscanning color monitor with .28mm dot pitch. Screen automatically corrects focus in all areas,



Accuvue 21-AP

including corners, and comes with antiglare coating. \$4600. Hitachi America, 201/825-8000.

### DigiVideo

Live-access video board for the Mac II series. Displays video and television in real-time in black and white on the Mac desktop, with instant frame capture. Adds 3-by-3.5-inch screen capability to the original MicroTV screen size of 1.5 inches by 1.8 inches. \$595. Aapps, 408/735-8550.



DigiVideo

### DrawingCard Display Systems

Family of two-page display systems for design applications for use with Mac II, IIfx, IICx, and IICI. Includes single-card graphics controller and a 21-inch flat-screen, high-contrast color or gray-scale monitor. Compatible with Apple's QuickDraw graphics standards. \$249. CalComp, 714/821-2000, 800/225-2667.



DrawingCard Display Systems

### The Electronic Color Splitter

Device that can be used with StudioTronics' ColorSet software and Koala Technologies' MacVision Digitizer to digitize images from any composite video source (such as a still-video camera) and derive a 24-bit color image. Breaks composite video images down into red, green, and blue signals. \$399. MicroSearch, 713/988-2818.

### FileSecure 1300

Tape-backup system that comes bundled with Retrospect software. Uses JVC DAT R120 tapes. \$4595. Tallgrass Technologies, 913/492-6002.



FileSecure 1300

### Gemini 020/030 Accelerator Cards

Accelerator boards designed to increase the speed of the Mac Plus and enable it to run 32-bit operating-system and application software. Increases virtual memory capacity to 16MB. \$795-\$1595. Force Ten Technologies, 415/436-0573, 714/956-6133.

### NB-A2100 Input/Output Board

Audio-frequency analog

input-output plug-in board for Mac II computers. Has a signal-to-noise ratio of 92 decibels, -95db total harmonic distortion, amplitude flatness of 0.015db to enable user to capture audio-frequency signals without introducing noise. \$1595. National Instruments, 512/794-0100.

### NB-DSP2300 Accelerator Board

Accelerator board for the Mac II. Operates at 33.33 million floating-point operations per second; has two DMA controllers; and, as a parallel processor, lets the user push data-transfer rates to 33.7MB per second. \$4995. National Instruments, 512/794-0100.

### PLP IIS

Personal laser printer with an 8-ppm engine, 1MB of RAM, and an extended font library. Prints with a resolution of 30 dpi and is based on Oki Electric OL-800 print engine. \$1899. GCC Technologies, 617/890-0880, 800/422-7777.

### PolyGraf/8

Hardware-software combination for data acquisition and display on the Mac II series. Consists of the PolyGraf/8 data-acquisition board and the SM/8 Signal Manifold. Has maximum data-acquisition speed of 1000 samples per second for each of its eight channels. (continues)



**PolyGraB**

nels. \$1695. World Precision Instruments, 203/469-8281.

### Porta-40i and Porta-80i Hard Drives

40MB and 80MB internal hard drives for Mac Portable. Porta-40i has formatted capacity of 40MB, average access time of 25ms; Porta-80i formats to 80MB, has 19ms average access time. 40MB \$799, 80MB \$1499. Dolphin Systems Technology, 714/558-3220.

### Remote/WakeUp Cable

Cable for use with Farallon's Timbuktu/Remote software

**Remote/WakeUp Cable**

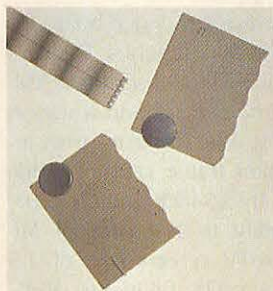
and Hayes-compatible modem. Lets user turn on Mac II by phone, and access, retrieve, and operate files. \$49.95. Farallon Computing, 415/596-9100.

### SIMMs for the Mac IIx

Memory upgrade for the Mac IIx in 1MB and 4MB SIMM panels that use 1MB and 4MB chips in surface-mounted configurations. 1MB SIMM \$125, 4MB SIMM \$575. Newer Technology, 316/685-4904.

### Tsunami Drives

Series of mass storage systems that range from 20MB to 210MB capacity, come with free nationwide on-site service for up to 90 days, and have warranty programs from one to five years. Drives measure 8-by-6-by-2 inches and weigh approximately 3 pounds. All drives have two SCSI ports for daisy-chaining, an external termination switch, SCSI ID switch, and quiet fan. Prices range from \$599 to \$1599. La Cie, 503/684-0143.

**Tsunami Drives**

### Uninet Slat

Unit that provides additional RS-232C serial and Centronics parallel ports to enable desktop workstations and Macs to use high-speed laser printers and low-cost personal printers that have only a parallel interface. With one parallel port \$575; with four serial ports and one parallel port \$900; with eight serial ports and one parallel port \$1600. Uninet, 714/546-1100.

### Vérité

Digital film recorder designed for high-speed exposure of 4000-line-resolution images for professional applications. Produces 2000-line or 4000-line resolutions and imaging times of three to eight minutes. \$5995. Liquid Light, 213/618-0274.

### The Wip

Family of compact external

# HP offers you the best things next

From input to output, Hewlett-Packard leads the way. With a full line of Mac-compatible printer and scanner choices.

For photographic-quality scanning, there's the HP ScanJet Plus scanner. Combine that with one of HP's high-quality printers. The DeskWriter, the new LaserJet III, the LaserJet IIP, or the LaserJet IID. HP even has color printers. The PaintJet and the PaintWriter XL.

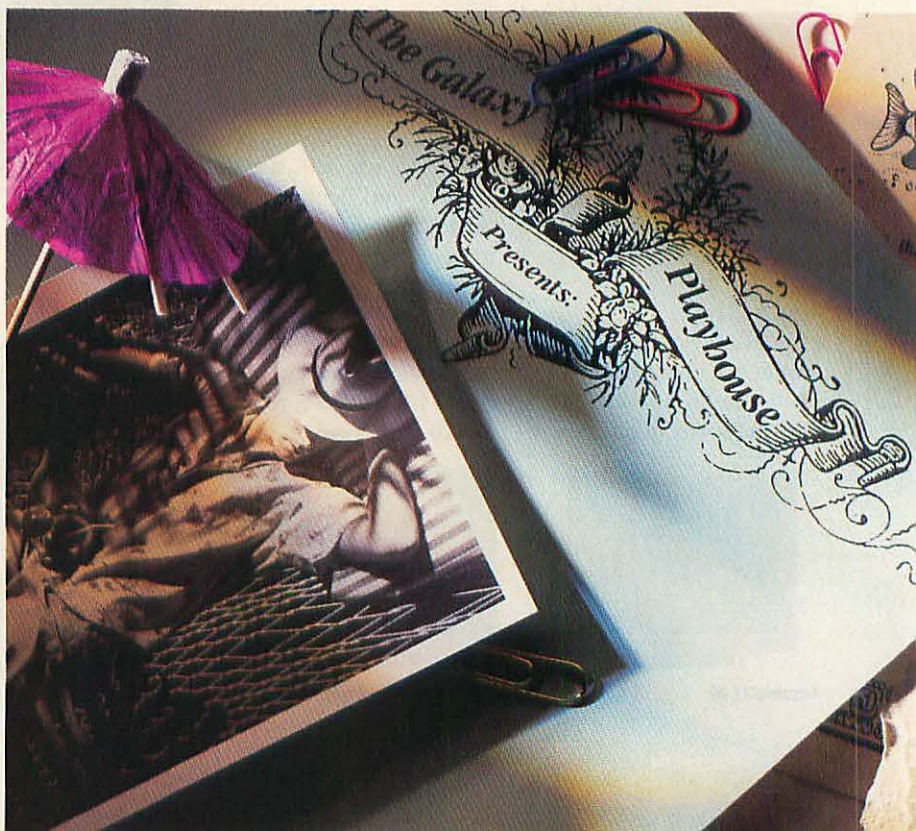
Plus, HP stands behind all their products with exceptional service and support. And a one year warranty. It doesn't get much better than that.

There is a better way.



**HEWLETT  
PACKARD**

Circle 288 on reader service card.







#### The Wip

hard drives, each weighing 1.5 pounds; available in capacities of 20MB, 40MB, 50MB, 80MB, and 100MB. These drives have an access speed of from 15ms to 27ms and contain drive mechanisms from Quantum, Conner, and Miniscribe. \$695 to \$1795. IDS Systems, 408/441-0500.

#### SOFTWARE

##### Accents & Borders 1

Collection of clip art that includes Designer Sets,

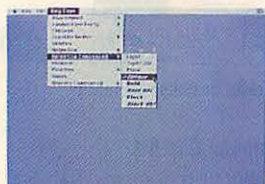


##### Accents & Borders 1

Borders, Frames, Ornaments, and Symbols. 1MB min. memory. Contains more than 250 images. \$129.95. 3G Graphics, 206/367-9321, 800/456-0234.

##### Adobe Type Reunion

Program that automatically sorts and arranges font libraries by family name and weight for users who typi-



##### Adobe Type Reunion

cally use 15 fonts or more. 1MB min. memory. \$65. Adobe, 415/961-4400.

##### Adventure Golf

Adventure game in which player tries to get through an 18-hole golf course while avoiding people, monsters, dangerous situations, and other obstacles to finishing the game alive. 512K min. memory. \$20. Funware/Superior Supply, 317/662-9922, 317/664-1558.

##### ArchiMovie

Animation software designed to create films on the Mac by collecting scenes under MultiFinder. User can play the series back in a variety of modes. Program makes color or black-and-white animations. Playback options include eight speeds, plus the ability to invert or add color, and center film on screen.



##### ArchiMovie

4MB min. memory. \$350. Gimeor, 202/546-8775.

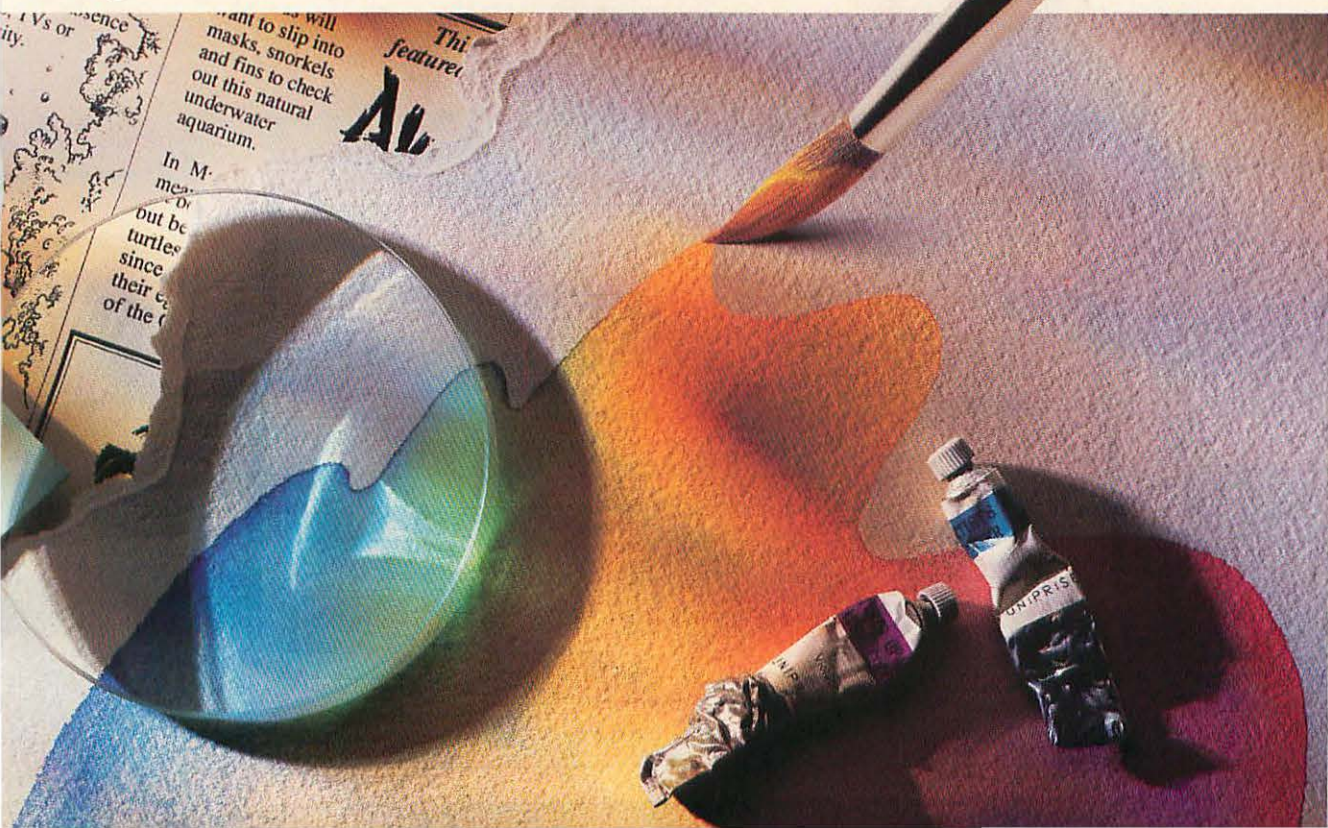
##### The Athlete's Diary

Multisport log for athletes. Maintains personal records for date, sport, time, distance, pace, route, and comments. Calculates pace using time and distance variables. Allows input in a variety of distance units. 512K min. memory. \$39.95. Stevens Creek Software, 408/725-0424.

##### Balance of the Planet

Game in which player is appointed High Commissioner of the Environment, with the exclusive power to *(continues)*

# to your Macintosh.







### Balance of the Planet

levy taxes and grant subsidies for projects that affect the environment. Simulates environmental problems as they may appear in the twenty-first century and gives players an opportunity to solve them. 1MB min. memory. \$49.95. Accolade, 415/985-1700.

### Barrage

Software for managing the printing of bar-codes on laser printers as well as on specialized bar-code printers. Drives the major bar-code printers including Intermec, Zebra, and Fargo. Drivers for running other bar-code printers can be

purchased separately. 1MB min. memory. \$995; \$595 each for specialized bar-code printer driver. Kessler Rollins, 916/791-5171.

### The Birthday Book

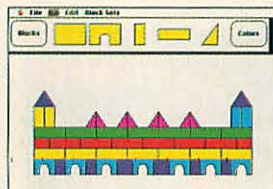
Database that lets users record birthdays and wedding anniversaries. Includes a compendium of names, birthday lore, birthstones, birthday flowers, colors and their meanings, and astrological signs and affinities. 1MB min. memory. \$35 plus \$4 s/h. Imateq Systems, 403/282-6720.

### Blocks Builder

Multicolored "blocks" for children; can be used much as real building blocks. 1MB min. memory. \$49.95. KinderLink, 603/672-4090.

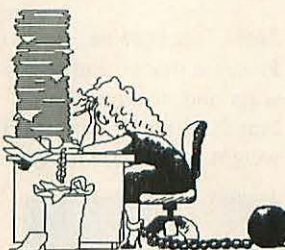
### ClickArt Business Cartoons

Collection of more than 100 bitmapped business



### Blocks Builder

cartoons drawn by Phil Frank, creator of the comic strips Miles to Go and Farley. 512K min. memory. \$49.95. T/Maker Company, 415/962-0195.



### ClickArt Business Cartoons

### Chinese Clip Art

Collection of more than 500 clip art images that use tra-



### Chinese Clip Art

ditional Chinese motifs. Includes single images and border designs. Images are in MacPaint format. 128K min. memory. \$79.95. Pacific Rim Connections, 415/697-0911.

### Correct Grammar

Grammar checker that identifies and corrects errors in spelling, grammar, syntax, punctuation, and style. Works with documents created in all ASCII-based word processing packages. Enables the user to choose the desired level of readability and flags any sentences exceeding that


# With the HP DeskWriter, you can

## The Paradise Times

VOL. III      SPRING, 1990      WANDERING TOURS LTD.

For the traveler craving the tropical essence of the Yucatan as well as a dash of the good life, Akumal is the place. It's not the luxury class of Cancun, but it beats the pants off most other small resorts along the coast.

Akumal prides herself on the conspicuous absence of telephones, TVs or bustling activity.



Folks, this town is laid back. It offers a good selection of hotels, dining and activities to soothe frazzled city nerves.

A large barrier reef runs parallel to the Quintana Roo coast, protecting the lagoon from the open sea. Basically it creates a gigantic underwater playground, chock-full of Caribbean underwater goodies which attract divers from all over the world.

For the archaeology buffs out there, Akumal is 15 km from Tulum. For the rest of us that means it's close to one of the few walled Mayan ruins.

Xelha is another 5 km, and even the amateurs among us will want to slip into masks, snorkels and fins to check out this natural underwater aquarium.


In Mayan lingo, Akumal means "Place of the Turtle" not because it's so laid back, but because giant green turtles have come ashore since the dinosaur days to lay their eggs in the warm sands of the Caribbean.

Surrounding Akumal are lush jungles and thick coconut groves. Bright red bromeliads bloom high in the trees during early spring, sustaining themselves on rain, dew and humidity. While checking out bromeliads, you will probably see it's cousin, the orchid.

Along the porous sand of the Akumal beaches, you'll find lots of really neat stuff: conch shells, facy red seaweed, coconuts sprouted after soaking in the sea for months, and crabs of all sizes and colors.

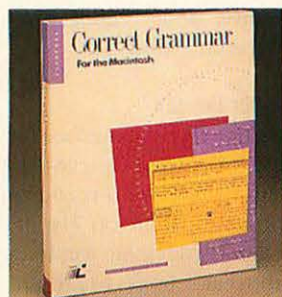
*This month's featured destination:*

## Akumal



*Relax amidst the long stretches of wind bent coconut trees which set off the blazing white sands of Akumal's sweeping beaches.*





**Correct Grammar**

level. Includes context-sensitive grammar tutorial that explains the grammatical rules behind suggestions and corrections. 1MB min. memory. \$79. Lifetree Software, 415/541-7864.

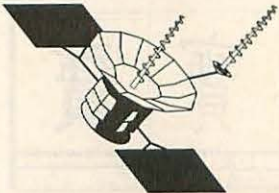
### DesignScript

Command-language interface that lets an end user or program developer automate the process of creating publications such as catalogs, price lists, and directories, whose contents change within a relatively

fixed format. User can automate the process of importing and formatting text data from a database. Does grayscale image composition and photo retouching. 2MB min. memory. \$125. Letraset, 201/845-6100.

### Electric Banana Illustrations

EPS clip art collection of computers, electronics, satellites, and other images for illustrating concepts in aerospace documents. Images can be scaled, rotated, and manipulated using drawing programs that support EPS. 1MB min. memory. \$125. Electric Banana, 213/370-4557.



**Electric Banana Illustrations**

### Entrypaq

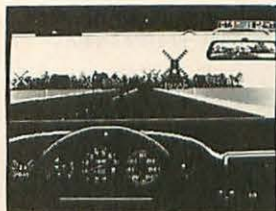
AI training package combines expert-system shell with a book on building expert systems. Software includes knowledge base of rules and objects described in the book. 1MB min. memory. \$110; software only \$79.95; book only \$34.95. Albathion Software, 415/824-2737, 800/338-0364.



**Entrypaq**

### European Challenge

Add-on scenery disk for use with car race game The



**European Challenge**

Duel: Test Drive II. Displays scenes of six European countries: Holland, Germany, Switzerland, Italy, France, and Spain. Contains a variety of cars to race and roads to travel. 1MB min. memory. \$21.95. Accolade, 408/985-1700.

### Financial Genius

Investment-analysis program with solving and reporting capabilities. Does amortization with graduated, balloon, and skipped payments; odd-day interest; points and fees; and complete or partial schedules. (continues)

# have it all. (But keep it to yourself.)



## The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a \$1,195\* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and Apple Talk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

There is a better way.



**HEWLETT  
PACKARD**

Circle 343 on reader service card





1MB min. memory. \$195. Softflair, 414/797-4490.

### Fiscal Knowledge

Accounting and financial-management software that runs in Excel; integrates spreadsheet and accounting activities. Lets user create unlimited general ledgers with subsidiary general ledgers. Keeps audit trail for all accounts; automatically compares budget estimates and actual figures. 1MB min. memory. \$395. Mathesis, 416/588-7592.

### FontStyle Info

Desk accessory or stand-alone application that acts as a reference and font index for typesetters and service bureaus. Compares a font's PostScript name with its Macintosh screen-font name, and gives copy-fitting information such as how many characters per pica

you can expect to get in a 10-point size for a given typeface. 1MB min. memory. \$49. New Century LaserType, 413/584-1715.

### Galaxy

Software for organizing, storing, and retrieving sounds and setups for synthesizers and other MIDI devices. Supports all features of Opcode's Patch Librarian; compatible with all MIDI devices supported by Patch Librarian. 1MB min. memory. \$249. Opcode Systems, 415/321-8977.

### The Gene Construction Kit

Software that provides a graphical interface for manipulating and tracking DNA sequences. Lets you cut and paste representations of DNA segments and attach comments. Graphic DNA editor keeps track of details automatically. Can

be used to create illustrations. Runs in color. 1MB min. memory. \$895; for academic institutions \$495; file-searching accessory \$350. Textco, 603/643-1471.

### Hanzi Assistant

Compact disc-based program helps students translate Chinese characters, or *hanzi*. Shows correct strokes for writing characters and allows users to hear correct pronunciation. Contains the basic 2500 characters of the Chinese language and includes homonyms and character variations. 1MB min. memory. Single copy \$100, site



Hanzi Assistant

license \$300. Panda Software, 603/646-2712.

### Hyper-Gscan

Macintosh user interface for the VAX-based Gscan full-text search-and-retrieval program. Built on HyperCard. Uses pop-up windows and dialog boxes to prompt user through using the Gscan system. User builds queries one piece at a time and Hyper-Gscan puts the pieces together to form a complete query. 2.5MB min. memory. \$500. Gscan International, 919/460-3100, 800/982-2177.

### KidsCard

HyperCard application for children between the ages of 3 and 8 who are beginning to learn about maps, clocks, calendars, and books. Program is organized around a child's room; uses Macintalk for simu-

# With the HP ScanJet Plus, you've

## The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for \$2,190\*, about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call 1-800-752-0900, Ext. 1005 for your authorized HP dealer.

There is a better way.



Circle 344 on reader service card



For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."



lated speech. 1MB min. memory. \$34.95. Kid's Concepts, 503/299-1829.

### **Kid Stuff: Comic People Volume Two**

Second volume of Comic People art disks for use with The Comic Strip Factory and other Macintosh graphics programs. Collection of bitmapped comic "parts" are grouped into "parts files" that can be combined to create images of five kids, two adults, and one cat. Includes graphic



**Kid Stuff: Comic People Volume Two**

"sound effects," and home and backyard backgrounds. 512K min. memory. \$39.95. Foundation Publishing, 612/925-6027.

### **MacLit**

Bibliographic retrieval tool that provides author, title, and subject citations of Mac books and articles. Contains retrospective magazine and newspaper citations from 1988 to the present and book citations from 1987 to the present. Quarterly updates are available on a subscription basis. 1MB min. memory. Run-time version \$149; one-year update subscription \$99. Black Gryphon, 914/266-3527.

### **MacShip**

Shipping-management system with automated error detection, customer lookups, zone lookups, rate calculations, printed shipping

labels, C.O.D. tags, and UPS shipping manifests. Includes report generator for creating customized reports, for example, form letters to customers. 1MB min. memory. \$595. D/P Data Systems, 407/231-3355.

### **Mac-U-Card SportsCard Inventory System**

HyperCard inventory system for collectors of baseball, football, and other types of sports cards. Stacks contain listings of cards and their market values, which may be updated by the user. Generates a variety of reports. 1MB min. memory. \$59. Macademics Software, 615/226-4581.

### **MediaTracks**

Training tool that allows users to "tape" a Mac screen session, edit it, add sound to it, annotate it, and play it back. Multimedia Pack

bundles the MediaTracks set of components with a MacRecorder Sound System. 1MB min. memory. With ScreenRecorder 2.0 DA, and MediaTracks editor \$295; Multimedia Pack \$495. Farallon, 415/596-9100.

### **MiBac Jazz**

Music-interpretation software that lets user type in chord changes and select meter and style. Program composes and transmits play-along piano, bass, and drums based on user input. Exports files as standard MIDI files so you can add a jazz rhythm section to other sequences. 1MB min. memory. \$295. MiBac Music Software, 507/645-5851.

### **MyAdvancedLabelMaker**

Label-making utility; sorts labels by category. Works with MyAdvancedMailList (continues)

# got it made in the shades.





and comes with indexed manual. 512K min. memory. \$49.95. MySoftware Company, 415/325-9372.

### NetMinder

Network software allows user to capture and examine Ethernet data. Collects statistics about Ethernet network use and data errors in both numeric and graphic format; allows user to customize program to collect other specific types of data. 1MB min. memory. \$495. Neon Software, 415/283-9771.

### Open Plan/Mac

High-end project-management software that is integrated with FoxBase+/Mac database. Files are compatible with IBM PC version. Does time analysis, resource analysis, and report generation. Functions are written in FORTRAN; user



Open Plan/Mac

interface is written in FoxBase. User can access the database to modify it or add fields. Uses uniform user interface across Macintosh, IBM PC, and VAX platforms. 4MB min. memory. \$4200. Welcom Software Technology, 713/558-0514.

### Panzer Battles

World War II strategy game that re-creates armored warfare in Russia. Characters are the German elite, who used armored formations and included the SS panzer divisions, and the Russian shock troops. 1MB min. memory. \$44.95. Electronic Arts, 800/245-4525.



Panzer Battles

### Presenting Now

Business utility that takes a snapshot of the screen image, which the user can manipulate for use in live presentations and demonstrations. Tools include a customizable pointer, arrows that can point in any direction, a freehand brush tool, and a highlighter. Enables user to do basic paint functions, including text input. Lets user place text on screen in any font size or style. 2MB min. memory. \$89.99. ISM, 301/527-1988.

### Real Estate Pro

Real estate-analysis soft-

ware with Microsoft Excel templates. Includes amortization schedules with worksheets for balloon-payment lookup, maximum mortgage qualification, buyer qualification, and mortgage comparison. 512K min. memory. \$79.95. Olympic Software Alliance, 206/426-9104.

### Resume Kit

Résumé-writing software that takes the user through a sequential process to help present skills, experience, and education in a clear and concise format. Program comes with nine résumé templates. 1MB min. memory. \$59.95. Spinnaker Software, 617/494-1200.

### Skiing America and Ski Europe

Two different guides to ski slopes and resorts in America and Europe. Includes

# With the HP LaserJet III, you can

*The Galaxy Playhouse presents Shakespeare's*

## AS YOU LIKE IT





information on the difficulty of various slopes, prices, nightlife, day-care availability, restaurants, and accommodations. 1MB min. memory. Each guide \$34.95 plus \$4 s/h. Imateq Systems, 403/282-6720.

#### **SoftMax**

Mac interface for controlling microplate-reader and analyzing data. Lets user set up files of routine instrument settings, templates, and data-analysis and data-display options. Used for



SoftMax

data acquisition and presentation. 1MB min. memory. \$1250. Molecular Devices, 415/322-4700.

#### **SPSS for the Macintosh**

Statistical data-analysis software lets researchers view data in a variety of ways. Generates tables and reports, and is compatible with CricketGraph. 2MB min. memory. \$795. SPSS, 312/329-2400.

#### **Statistics Graphics Toolkit**

Programmer's tool that gives scientists, engineers, mathematicians, and developers access to a library of 300 graphics and analytical routines to use while writing statistical software. 1MB min. memory. \$79.95. True Basic, 603/298-8517, 800/872-2742.

#### **Studio Line CD**

Design and publishing soft-

ware that is bundled in CD ROM format. Contains DesignStudio for page design and production; ColorStudio for creating 24-bit color images; ImageStudio for gray-scale image processing; LetraStudio for designing display type and headlines; and FontStudio for creating and customizing fonts and logos. 1MB min. memory. \$3500. Letraset, 201/845-6100.

#### **StudyMate**

Software that lets students and professionals use own materials to create practice tests to prepare for exams. Program provides a variety of formats including multiple choice, question and answer, true-false, spell-scramble, and fill in the blanks, along with a vocabulary disk to build vocabulary skills. 512K min. memory. \$49.95. Compu-Teach,

203/777-7738, 800/448-3224.

#### **Stylist**

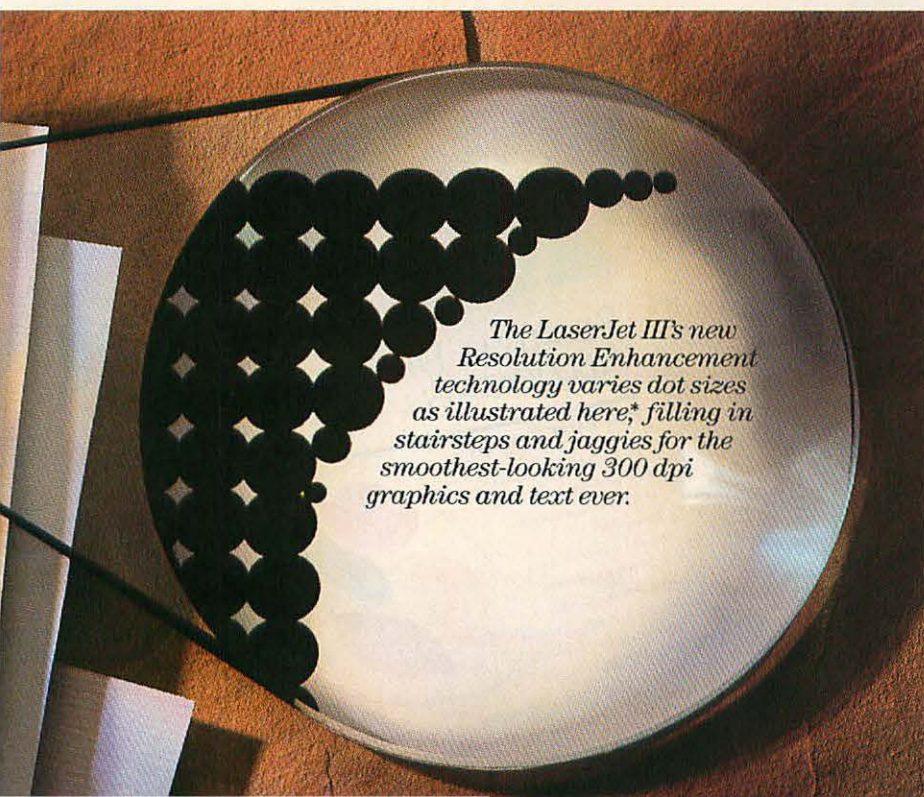
Utility package for users of Microsoft Word 4.0. Includes a collection of more than 20 Quick Templates that enable Word users to produce formatted documents by supplying their own text; also provides a supplemental spelling dictionary. Prints a complete description for style sheets for permanent documentation. 1MB min. memory. \$79.95. System Network Architects, 609/799-9605.

#### **Torah Scholar**

Bible-research and -study program containing the complete Hebrew text and English translation of the Chumash—the five books of Moses. Enables the user to scan the text of the Chumash and calculate word

*(continues)*

## refine your characters.



*The LaserJet III's new Resolution Enhancement technology varies dot sizes as illustrated here,\* filling in stairsteps and jaggies for the smoothest-looking 300 dpi graphics and text ever.*

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HP offers other LaserJets with Adobe PostScript software. The LaserJet IID printer with increased paper-handling capability. And the affordable LaserJet IIP printer. For character-building information and the name of your nearest authorized HP dealer, call 1-800-752-0900, Ext. 1168.

There is a better way.



Circle 299 on reader service card.





frequency and internal spacing between letters—a method researchers are using to find hidden meanings and allusions in the Bible. 1MB min. memory. \$295. Davka Corporation, 312/944-4070.

### Vietnam Remembered

CD ROM disc of images and information that relates to the Vietnam War, compiled from both public and private sources. Sections include biographies; statistics; equipment; bibliography; chronology of battles, missions, and other events; glossary of terms; and the



Vietnam Remembered

list of names from the Vietnam Veterans Memorial. 1MB min. memory. \$99. Wayzata Technology, 612/460-8438.

### Welltris

Game designed by Alexey Pajitnov, designer of Tetris. The game's perspective is that of looking down into a four-sided well with gridlike walls and bottom. Player's objective is to make solid rows by manipulating falling pieces formed by various configurations of squares. Pieces appear randomly, one at a time, at the top of any side and slide to the bottom. 1MB min. memory. \$39.95. Spectrum HoloByte, 415/522-3584.

## ACCESSORIES

### Acco Non-Magnetic Copy Holder

Stand-alone copy holder

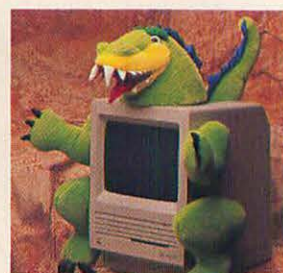


Acco Non-Magnetic Copy Holder

with sliding line guide that attaches horizontally, on left- or right-hand side, or vertically for work on spreadsheets or tabular information. Comes in five colors: beige, blue, burgundy, gray, and black. \$17.95. Acco, 708/541-9500, 800/222-6462, 800/942-6999 in Illinois.

### Computer Critters

Stuffed animals that attach with Velcro to the sides of computers. Rabbit and teddy bear \$29.95 each; bulldog and dragon \$34.95 each. Computer Critters, 818/333-7273.



Computer Critters

### Designer's Key for High Resolution Printers

11-by-17-inch card folds into six faces displaying sample widths, shade screens, bullets, blends, type resolution, and text over screen resolution when printed on a LaserWriter at 300 dpi and



Designer's Key

# Pigments for your imagination.

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Entertain your thoughts with HP's PaintJet and PaintWriter XL color printers. Both are fully Mac-compatible and let you use all Quickdraw-based software applications. That means high-quality Macintosh II output in 16.7 million colors.

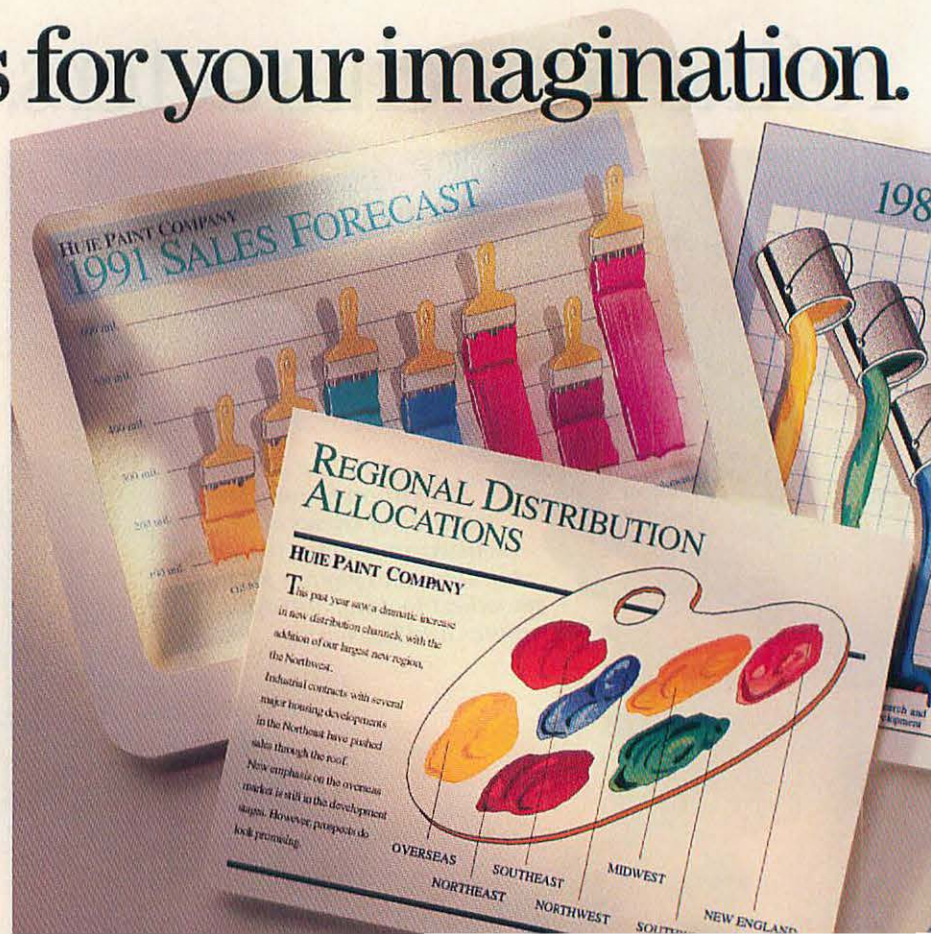
Print on paper or transparencies with 13 scalable outline fonts. And for shared use, the PaintWriter XL offers AppleTalk, faster speed, and auto sheet feed. For sample output and the name of your authorized HP dealer, call 1-800-752-0900, Ext. 1167.

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on a Linotronic printer at 1270 dpi and 2540 dpi. \$9.95. Terry Kuenzli Enterprises, 408/379-4746.

### Diskette Library File Multi-Pack

Set of four disk holders, each with a capacity of ten 3 1/2-inch disks. Packaged in multicolored sets with black, burgundy, platinum, and slate blue holders. \$11.85. Acco, 708/541-9500, 800/222-6462, 800/942-6999 in Illinois.

## BOOKS & VIDEOS

### Learning PageMaker

Step-by-step PageMaker tutorial that takes a cookbook approach. Designed for use in classroom curriculum or individually at home. Comes with interactive software (1MB min. memory) on disk. Contains exercises that show meth-

ods for creating typical publications. Has sections on designing forms, newsletters, display ads, three-fold brochures, and business cards. Written by Richard P. Komorowski. \$29.95. Laser Typer, 408/243-6902.



Learning PageMaker

### The MacDirectory

Directory that contains 800 and standard telephone numbers for a variety of companies that produce or sell Mac-related products. Divided into sections containing numbers for dealer and technical support assistance. Contains reference section and index. \$9.95. The Marketing Clinic, 603/352-9836.

### Mapping Hypertext

Book providing analysis of how to represent information in computer-based format. Gives overview of hypertext and hypermedia, including notes on the people who came up with the key ideas and first implemented the technology. Written by Robert E. Horn. \$34.50. Information Mapping, 617/890-7003.

### Power Sequencing with Master Tracks Pro/Pro 4


Book that contains 122 tips for the music sequencing program Master Tracks Pro and MasterTracksPro 4. Includes chapters on basic MIDI and synchronization techniques. \$19.95. Music Sales, 212/254-2100.

### The WYG Guide

Book of PostScript specimens of Adobe and Linotype font settings from 6 to



The WYG Guide

48 points. Gray-scale reproductions of screen tints, rule widths, corner radii, and charts with symbols' keyboard locations. \$14.95. The Communications Company, 708/246-8620. 

.....  
To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, phone number (and two copies of software) to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.



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Macintosh interface.*  
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# Quick Tips

FILE SHARING, START-UP SCREENS, PAGEMAKER GRAPHICS REDUCTIONS, AND MORE



BY LON POOLE

Organizing Imelda Marcos's shoe closet would be easier than systemizing the teeming hordes of fonts, preference settings, start-up documents (INITs), Control Panel devices (cdevs), dictionaries, printer drivers, system files, and miscellane-

ous stuff in a typical System Folder. You can bunch related icons together in piles, as a tip in the May issue suggested. That's a lot of work, though, and makes it impossible to see what's in the System Folder using an icon view. A better solution for the compulsively neat among us is the shareware program Tidy It Up, which arranges items in the System Folder quickly, safely, and neatly by category (see "System Folder Organizer"). You can use the program's preset categories and icon spacing or define your own. Tidy It Up is available from user groups such as BMUG (415/549-2684) or from online information services such as CompuServe (MacPro forum, library 7, file name TidyUp.sit).

## HyperCard Restrictions

As I mentioned back in January, HyperCard lets you restrict its Find command to a specific background field. Carl Gandola of Cincinnati, Ohio, however, points out that if your stack contains more than one background, this restriction might not work as you expect. To demonstrate the problem, create a new stack (don't copy the current background). Create a background field named Quote and type *I never forget a face, but in your case I'll be glad to make an exception. —Groucho Marx* into it. Next make a new background in the same stack. To visually distinguish the new background, paint

it gray. In this background, create a new field named Citation and type *I don't have a photograph, but you can have my footprints. They're upstairs in my socks. —Groucho Marx* into it. Then test the restricted Find command by going back to the first card in the stack and typing Find "Groucho" in bg fld "Quote" into HyperCard's message box.

When you press Return, HyperCard locates *Groucho* in the background field named Quote. But press Return again to repeat the Find command and HyperCard locates *Groucho* in the field named Citation, ignoring your restriction to look only in the field named Quote.

Apparently, HyperCard restricts the Find command by field number, not by name or by ID. Workaround: Make sure fields to which you'll be restricting searches have field numbers higher than field numbers in other backgrounds. To give a field the highest number in its background, select the field and press ⌘-Shift-Minus. If you can't avoid field-number conflicts, then either use the fields you don't want searched only for information completely unrelated to the field you do want searched or don't use them at all.

## Too Much Space Before

As discussed in the March column, Microsoft Word 4.0, unlike earlier versions, doesn't ignore extra space be-



fore a heading that falls at the top of a page. (You set extra space before using the Paragraph command.) As a result, a document can have unequal top margins.

Shirley Kehr of Silverado, California, has a simpler method for working around this regrettable situation than the one I suggested. Her style definitions specify Space Before as part of the paragraph format for headings. Before printing her document, she goes through it in page view looking for extra space at the top of each page. She removes extra space Word has left at the top of a page by clicking anywhere in the first paragraph on the page and then clicking the closed-space icon (the third icon from the right) in Word's ruler. If later revisions change page breaks, she reinserts the deleted space by reapplying the paragraph's original style. If she isn't sure whether a paragraph is missing its preceding space, she clicks in the paragraph and checks the style name reported at the bottom of the document window. The name ends with a plus (*continues*)



sign and three periods if the paragraph style is modified.

### Low Down Footers

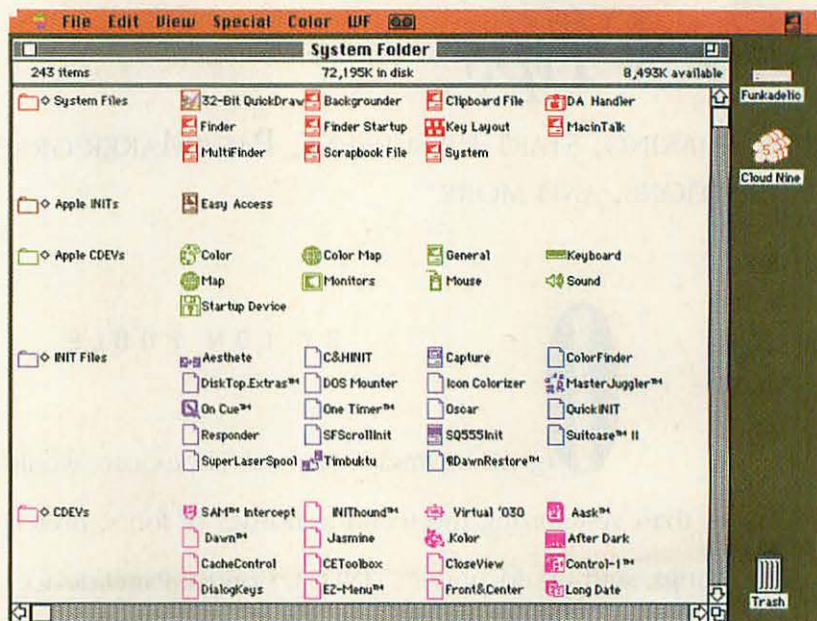
Shirley Kehr also has a method for fixing footers that are too high or headers that are too low on a word processing page. Choose Page Setup from the File menu, click the Option button, and set the Larger Print Area (Fewer Downloadable Fonts) option. Now you can position the footer lower and the header higher on the page. Use MacWrite II's Page command (Format menu) to set top and bottom margins as small as 0.105 inch. In Word, use the Section command (Format menu) to set the header and footer positions to 0.264 inch or larger. Alternatively, you can use Word's Page Preview command (File menu) and drag the header and footer up and down. In WriteNow, put blank lines below the footer and above the header to position the header and footer within the printable space on the page. To see the printable rectangle, use WriteNow's Show Space command (View menu).

### Start-up Screen

How the heck do I get something other than the usual boring start-up screen on my Mac Plus? "Welcome to Macintosh" wears thin after the first few years. My hobby is cartooning, and I'd like to create my own weird start-up screens.

Robert W. McHenry  
McLean, Virginia

The Mac will replace its standard start-up screen with the image from a special kind of graphics file named StartupScreen in the System Folder. You can save black-and-white artwork the size of a Mac Plus screen (512 by 342 pixels) as a start-up screen file by using the Save or Save As command (File menu) in MacPaint 2.0 (Claris Corporation, 408/987-7000) or SuperPaint 1.1 or 2.0 (Silicon Beach Software, 619/695-6956). However, you should put the image in the upper-left corner of the StartupScreen document or else the image will not appear. PixelPaint 2.0 (SuperMac Technology, 415/964-8884) can save a larger image—in black and white, gray scale, or color—as a start-up screen



### System Folder Organizer

Given enough time and patience, you could arrange the items in your System Folder as neatly and logically as the shareware program Tidy It Up does. For each category of item, it creates an empty folder, labels it with the category name, and lines up all icons of that category with that folder.

file. In addition, Giffer 1.06 (shareware) can convert any graphic from GIF or PICT format to the start-up screen format. PICT is the standard Macintosh graphics format; GIF is a general graphics format developed by CompuServe and supported by many different computers. Giffer is available from user groups such as BMUG (415/549-2684) or from online information services such as Connect (Mac Symposium file libraries, file name Giffer 1.06 .sit).

Alternatively, you can put a large black-and-white or color image from any color graphics program into an existing start-up screen file by using the standard Scrapbook desk accessory and ResEdit, a utility available through APDA (800/282-2732 in the United States; 800/637-0029 in Canada; 408/562-3910 international). First, copy a picture from the graphics program and paste it into the Scrapbook. Then use ResEdit to open the Scrapbook file and locate the PICT resource that contains the color picture. Copy that resource and paste it into the StartupScreen file, and change its ID to 0. The Mac will use as a start-up screen a picture that's included as PICT resource ID 0 in the System Folder's StartupScreen file.

### Very Local File Sharing

In March you talked about connecting a Mac to a LaserWriter using a standard printer cable. I'd like to hook my Mac to my wife's Mac. They're about 6 feet apart. Can I use a printer cable, or do I need a 6-foot SCSI cable? I would like to transfer an occasional file to her disk and vice versa, but my real objective is to run her Mac from mine.

Bob Greenspan  
Bonsall, California

If you're transferring one file a week, use a floppy disk. For more frequent file sharing, you can connect your Macs using Apple's LocalTalk wiring or Farallon's PhoneNet wiring. LocalTalk wiring is OK, but PhoneNet wiring is cheaper and more versatile. It uses standard telephone cables like those that connect modular phones to wall jacks. With PhoneNet, you may even be able to connect Macs in different rooms of your house using existing telephone wiring.

In addition to the PhoneNet or LocalTalk wiring, you'll need some software to manage file transfers. For basic file exchange, you can't beat Claris's free Public Folder software (continues)







(available from user groups and on-line information services). It lets you copy files from special folders named Public on all Macs in the network that have Public Folder installed. Likewise, the contents of your Public folder are available for other network users to copy.

To make your disks available to other Macs on the network and to access disks made available by other network computers, you need file-sharing software like TOPS (TOPS, 415/769-9669). Apple has also announced that System 7.0, which requires at least 2MB of RAM, will have built-in network file sharing. TOPS works with earlier versions of system software on as little as 512K of RAM. File-sharing software lets network users make one or more of their disks available for other network users to mount on their desktops. Once you've mounted a remote disk, you can use it like any other disk on your Macintosh. File-sharing software is only practical for sharing hard disks; floppy disks are frequently ejected and are too slow.

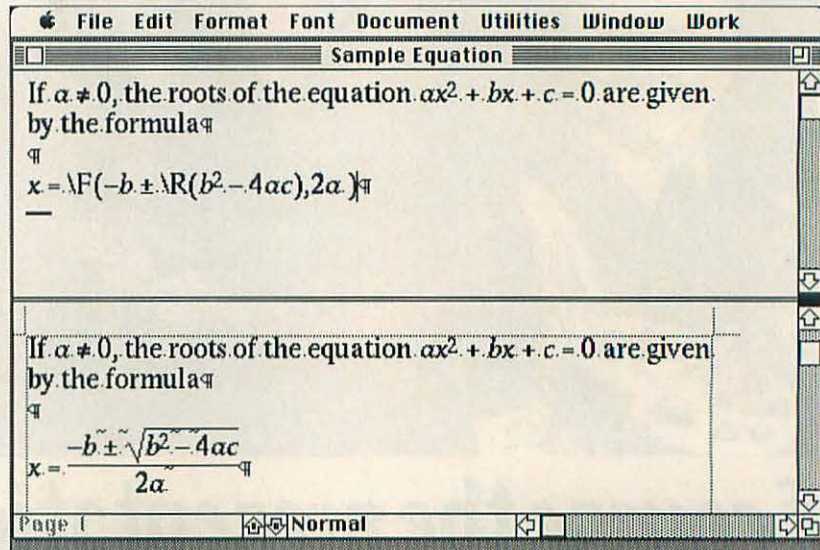
If you had more Macs on your network, you might want to set up an electronic mail system using E-mail software like QuickMail (CE Software, 515/224-1995). With E-mail, network users can send each other messages and files. E-mail isn't file sharing, however. It doesn't give you access to the disks of other Macs on the network.

You can control (or simply observe) another Mac on the network if both have Timbuktu installed (Farallon, 415/596-9100). This software suppresses your Mac's desktop image to show the other Mac's desktop on your screen and sends your keystrokes and mouse movements to the other Mac.

Forget about using printer cables or SCSI cables. Transferring files via printer cable is far less convenient than via a network. The SCSI port is not meant for interconnecting Macs.

#### Magic Sizes

**TIP** When you reduce a bitmapped image (72 dots per inch) in PageMaker by dragging the corner of the image, PageMaker doesn't tell you the percentage reduction. Unless you luckily reduce to just the right size, moiré patterns and jaggies appear in the printed work. But if you use the Place



#### Double Take

You can see Microsoft Word formula typesetting commands and their results simultaneously by splitting the document window and setting Page View in the Document menu and Show ¶ in the Edit menu.

command—not the Paste command—to put the image in the publication, you can reduce the graphic proportionally to any of four magic percentages: 96, 72, 48, and 24. Because these percentages match the image's 72-dpi resolution to the LaserWriter's 300-dpi resolution, you get no moiré patterns or jaggies. Reducing a 72-dpi image to 24 percent results in a 300-dpi image when printed on a 300-dpi printer.

That's a great hint in and of itself, if you don't already know about it, but here comes the really great stuff. You can get more magic reduction-percentages by using the same technique with PageMaker set for a high-resolution printer. For example, I got 18 reduction sizes with PageMaker set for the Agfa 9000PS. To set PageMaker for a high-resolution printer, drag a copy of that printer's APD file into your System Folder. If PageMaker is open, quit it. Then reopen PageMaker and open any PageMaker document. Choose Print from the File menu, click the Change button, select the new type of printer, click OK to confirm the printer change, and press Cancel to dismiss the Print dialog box.

Philip C. Russell

Waldport, Oregon

My copy of PageMaker (3.02CE) didn't include an APD for the Agfa 9000PS, and Aldus Tech Support couldn't help me locate a copy. However, the Varityper VT-600.apd file gave me reduction sizes of

40, 32, and 12 percent in addition to the LaserWriter's four reduction sizes. —L.P.

#### Split View

**TIP** Microsoft Word 4.0's split-window feature lets you see the same section of a document in both page view and normal (galley) view at the same time. For instance, you can build a formula and instantly see the results, as shown in "Double Take." This same technique is useful for any other adjustments that make you switch to page view to see the results.

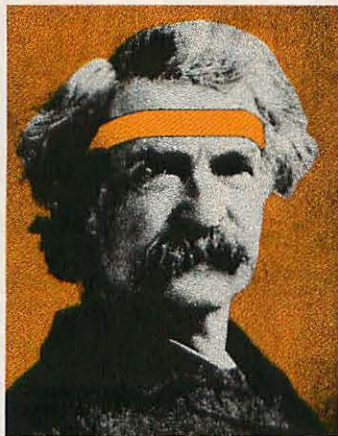
Paul Stankiewicz

Vestal, New York

.....  
We pay from \$25 to \$100 for tips published here. Send tips or questions (include your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (294-8078). All published submissions become the property of Macworld. ☐

Lon Poole answers readers' questions and selects their tips for this monthly column. He has written many personal computer books, including the quick reference HyperTalk (Microsoft Press, 1988), and a new book of Mac tips (to be published this summer by Microsoft Press), Amazing Mac Facts.

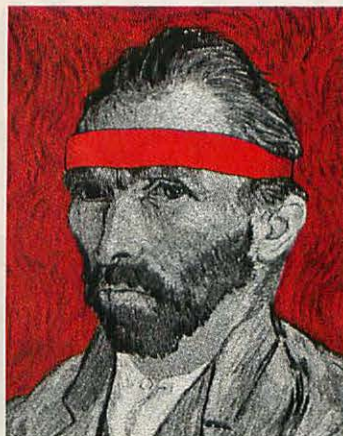




**Word Processor**



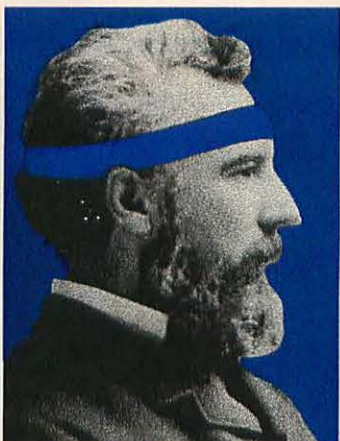
**Database**



**Paint**



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**Telecommunications**



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# Getting Started with Paint and Draw Software

EXPLORING THESE TWO VERY DIFFERENT TYPES OF GRAPHICS PROGRAMS

W

BY JIM HEID

Word processors might be the Macintosh world's most popular applications, but graphics programs are the most appealing. Start up a word processor for a few friends and they'll probably show lukewarm interest. But fire up a graphics

program and watch them line up for their turn at the mouse. People who would never dream of standing in front of an easel and canvas suddenly become artists-in-training, spilling paint all over the screen.

Perhaps graphics programs are enticing because people view a computer as a tool for calculating, not an artistic medium. Or maybe it's the sense of experimentation that draws you in. Move the mouse, get a circle. Oops, erase that mistake. Hey, the little spray can works just like a real one.

Ever since MacPaint blazed the trail in 1984, graphics programs have been instrumental to the Mac's success. Indeed, there are more ways to create images with the Mac than there are to process words—proof of the machine's graphical bent. This month, I'll explore some of the technicalities behind Macintosh graphics and spotlight the features you'll find in the current crop of graphics programs. And because not everyone has artistic aspirations, I've included some tips on other ways to put graphics software to work (see "Ten Ways to Use a Graphics Program").

## Different Brush Strokes

Graphics programs come in two basic flavors: *bitmapped* and *object oriented*. Because of their different approaches to storing and printing images, each is suited to specific purposes. Some programs combine both approaches. In any case, understanding the differences between bitmapped and object-oriented graphics is an important first step in choosing graphics software and using it effectively.

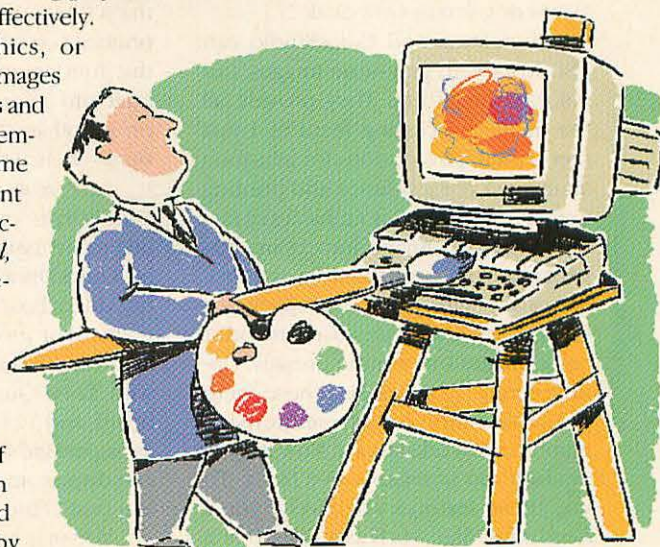
Bitmapped graphics, or paint, programs store images as a series of bits—ones and zeros—in the Mac's memory. With monochrome (black-and-white) paint programs such as MacPaint, each dot, or *pixel*, in an image corresponds to one bit in the Mac's memory. If a dot is black, its bit is a one; if a dot is white, it's a zero. Think of a sheet of graph paper. Each square is a bit, and you create images by

darkening some squares and leaving others white. To change part of the drawing, you change its black squares to white ones, and vice versa.

Color paint programs such as SuperMac's PixelPaint work similarly, except they assign more than one bit to each pixel. It's as if you laid several sheets of graph paper on top of each other, and selectively blackened squares on each layer. The on-off combinations of a pixel's bits tell the Mac what color that pixel is (see "Painting versus Drawing").

## Darkrooms on a Disk

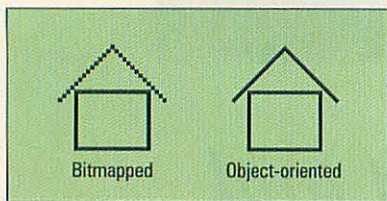
Close cousins to paint programs are *image processing* programs such as (continues)



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## GETTING STARTED HOW TO



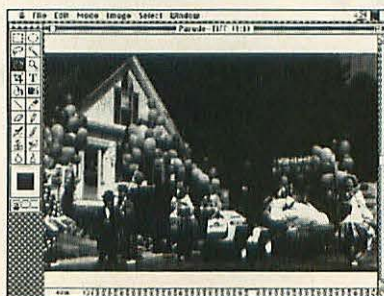
### Painting versus Drawing

A paint program (left) maps screen pixels to bits in the Mac's memory (1 bit per pixel for monochrome programs, 8 bits for gray-scale and most color paint programs, 24 bits for high-end color programs). The on-off combinations of those bits specify that pixel's color. A drawing program (right) stores QuickDraw instructions that describe the image. Regardless of the type of program it was created in, a graphic—like all Mac screen images—is displayed on the screen as a bitmapped image.

Letraset's ImageStudio or ColorStudio, Adobe Photoshop, or Silicon Beach's Digital Darkroom. Like color paint programs, they work with bitmapped images containing multiple bits per pixel. But image processing programs are designed for retouching and modifying scanned images (see "Getting Started with Scanners," *Macworld*, November 1988). Digital Darkroom and ImageStudio work with *gray-scale* images, allowing you to adjust brightness and contrast, retouch flaws, create special effects, and choose from a variety of *halftoning* options to get the best possible output.

On Macs with color or gray-scale video hardware, these programs display true shades of gray. On monochrome Macs, they simulate gray by combining black pixels and white pixels into patterns—*dithering* (see "Dithering versus Gray-Scale").

Photoshop and ColorStudio can also work with gray-scale images, but color is their forte. They provide all the image processing features I just mentioned, plus options for adjusting an image's color balance and printing a *color separation*—four pieces of film that break an image into cyan, magenta, yellow, and black layers. Professional printers use these separations to produce the plates used to print color images on printing presses. Until recently, features like these were available only on ultraexpensive graphic-arts workstations. Now they're available on ultraexpensive Macs. To use these features effectively, you'll need a fast Mac, such as an SE/30 or a



### Dithering versus Gray-Scale

Dithered grays (top) are rough approximations of true gray shades (bottom). The Mac SE/30 and Mac II family can display true gray shades when equipped with color or gray-scale video hardware.

member of the II family, with several megabytes of memory and a 24-bit video board like SuperMac's Spectrum/24 or Apple's Video Card 8•24.

### 8 Bits, 24 Bits, 32 Bits, Hike!

The first color paint and image processing programs allowed you to work with up to 256 colors or gray shades at a time. That was adequate for gray-scale images, but not enough to display color images with photographic realism. The Mac II's original color video board couldn't work with more than 8 bits per pixel, nor could the original version of *Color QuickDraw*, the fundamental graphics routines built into color Macs. Eight bits can be on or off in 256 different combinations—hence the 256-color limit.

Last year Apple released *32-bit QuickDraw*, which allows up to 32 bits to be assigned to each pixel. 32-bit QuickDraw paved the way for 24-bit video boards and for paint programs that give you direct access to over 16 million hues. A Mac equipped with 32-bit QuickDraw, a 24-bit video board, and a 24-bit paint program such as SuperMac's PixelPaint Professional can display images with startling realism (see "True Color").

You may have noticed an 8-bit dis-



### True Color

A 24-bit color image displayed by an 8-bit video board (top) and a 24-bit board (bottom). Note the smoother color gradations in the 24-bit version. Because an 8-bit board is limited to working with a maximum of 256 colors, it must resort to dithering to simulate the colors it can't directly render.

crepancy between 24-bit color and 32-bit QuickDraw. Those extra 8 bits are reserved for an optional work area, the *alpha channel*. Some programs don't use the alpha channel at all. Others, including Photoshop and ColorStudio, let you use the alpha channel to create a *mask* that protects part of an image from modification. For example, before working on the background in a photograph of a car, you might first create a mask for the car to avoid accidentally altering it.

The new QuickDraw is built in to the ROM chips of the Mac IIci and IIfx. To use it with other Mac II models and the SE/30, you need Apple's 32-bit QuickDraw file and System 6.0.3 or later. You can get both from an Apple dealer or a user group.

### Drawing Distinctions

When you create an image—such as a circle—with a paint or image processing program, as soon as you release the mouse button the circle loses its identity as a circle and becomes simply a series of pixels. You can't change the circle's size, line thickness, or any other characteristics; instead, you must



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## TEN WAYS TO USE A GRAPHICS PROGRAM

**Y**ou don't have to be a modern-day Monet to benefit from a graphics program. Here are some project ideas for using paint or draw programs (or both) for something other than painting or drawing.

1. Spruce up a business graphic. The graphs and charts created by programs like Microsoft Excel, Informix's Wingz, and Ashton-Tate's Full Impact are actually object-oriented drawings. You can use the Clipboard to move them into a draw program for further polishing, such as replacing the bars in a bar chart with icons representing the data (for example, using automobile icons in a car-sales chart).

2. Make quick-reference cards. Can't remember which dialog box contains that certain option or which menu holds the command you need? Use the Mac's snapshot feature (press  $\text{⌘-Shift-3}$ ) to create a MacPaint image of the screen, then annotate the image with text. Print the result and you have a custom-made quick-reference card. The Mac names snapshot files Screen0, Screen1, Screen2, and so on, through Screen9. (After that, you must rename or delete snapshot files to take more.) To capture color screens or pulled-down menus, you'll need a special utility, such as Mainstay's Capture.

3. Make a start-up screen. You can replace the "Welcome to Macintosh" message with any image you like. Many paint programs, including MacPaint 2.0 and SuperPaint 2.0, can create start-up screens. The image must reside in the System Folder and be named StartupScreen.

4. Create a logo for a database form. Most database managers let you create custom forms and paste images from the Clipboard into your form designs. Use this technique to add your logo to a form; create the logo in a program, then copy and paste it into the form.

5. Retouch scanned images. You can use any paint program to retouch a scanned image saved in MacPaint format. To retouch a gray-scale image saved in TIFF format, you'll need a program that can handle TIFF files. All color paint programs can, but for serious electronic retouching, you'll want an image processing program.

6. Create special text effects. It's easy to stretch or condense text by using a draw program in conjunction with a desktop publishing program or word processor. First, type the text using the draw program. Next, select the entire block of text (not its individual characters) using your draw program's arrow-shaped selection tool and then copy the

selection to the Clipboard. Switch to a word processor or DTP program and choose Paste, and you have a picture of the text that can be resized (see "Transforming Text"). If you don't have Adobe Type Manager, the resized text will probably look ragged on screen, but it will print with sharp edges on a PostScript printer or GCC Personal LaserPrinter. Note that this technique may not work with every combination of word processor and drawing program. For example, when you paste MacDraw II text into Microsoft Word or MacWrite II, it appears as conventional text, not as a graphic. This problem doesn't occur if the original text is created in SuperPaint 2.0 or Drawing Table.

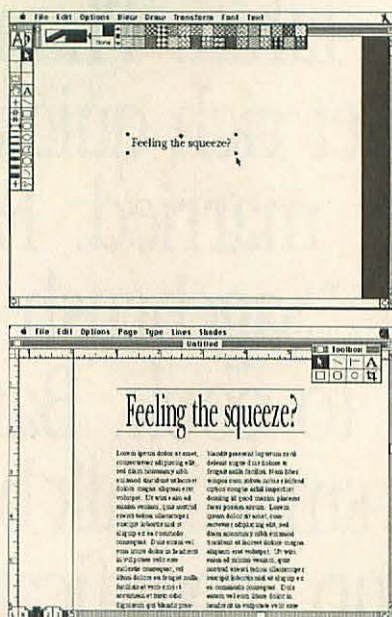
7. Make a poster. Most draw programs can print poster-size drawings by *tiling*—printing sections of the drawing on individual pages that you attach to each other. You can use this feature to create large posters—up to 81 square feet in Canvas. However, some programs (including Canvas) limit maximum type size to 127 points. If you need larger text, use the previous tip to stretch a picture of text to the size you need.

8. Create a publication. With their rulers, line-drawing tools, and alignment features, draw programs make serviceable DTP programs, especially for a small job, such as a brochure or a single-page fact sheet. Canvas 2.1 and MacDraw II 1.1 even have spelling checkers.

9. Create a presentation. MacDraw II 1.1 provides several features for creating overhead transparencies and slides (see "Getting Started with Desktop Presentations," July 1989). Electronic Arts' Studio/1 (for monochrome) provides impressive yet easy-to-use monochrome animation features. Studio/1 and Studio/8 also include

a slide-show application that lets you move from one image to the next by clicking the mouse. You can also specify special transition effects, such as dissolves and wipes, between images. With a dissolve effect, one image fades out while the next fades in; with a wipe, one image appears to push the previous one off the screen.

10. Modify clip art. Several companies sell libraries of canned illustrations that you can use in desktop publications. Instead of just using a clip art drawing as is, copy it to a graphics program and personalize it—add some shading or flip it horizontally. Or autotrace a bitmapped clip art image to improve its appearance.

**Transforming Text**

At top is the text (18-point New Baskerville) as it appears in the draw layer of SuperPaint 2.0; at bottom, the stretched text in a PageMaker document. Note that you can't edit a picture of text; to correct a typo or change the text, you'll need to return to the drawing program.

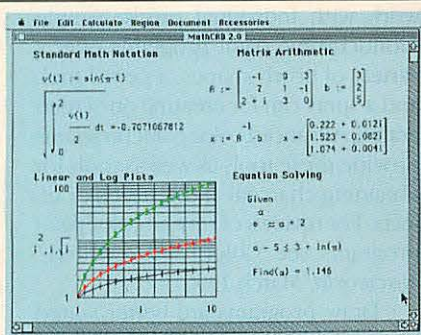


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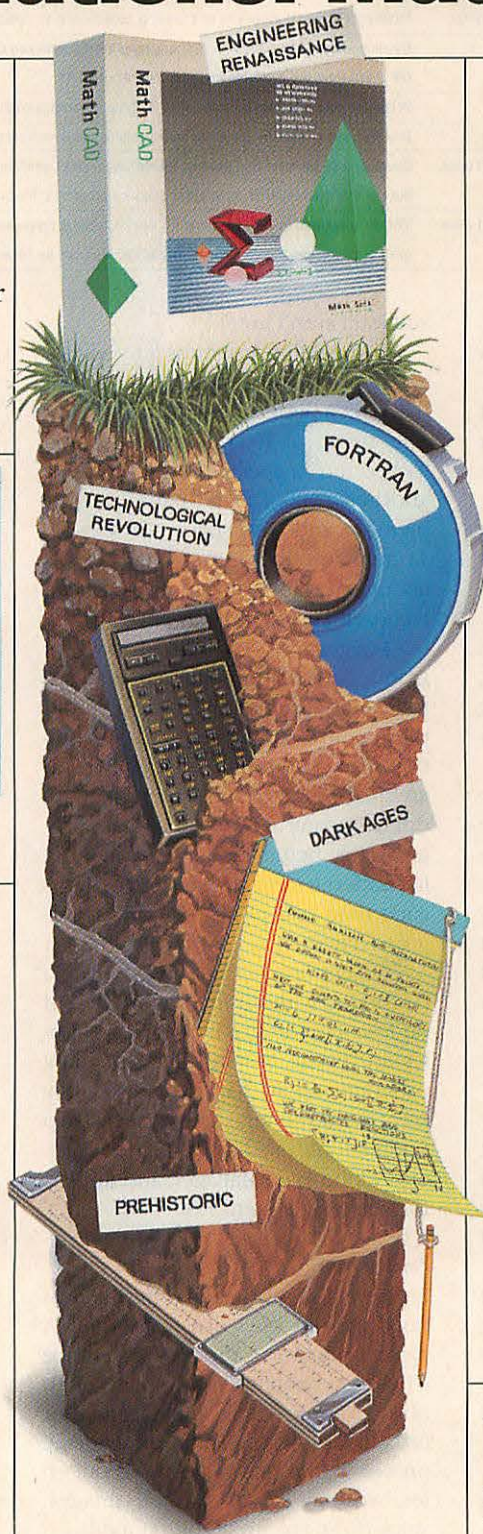


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## STORING PICTURES

Format	Best for	Comments
EPS	Text and bitmapped or object-oriented graphics to be printed on PostScript printer	Widely supported in both Mac and PC worlds; generally used to export images from PostScript drawing programs or scanning applications to desktop publications
GIF	Bitmapped images	Developed by CompuServe for exchanging graphics between different systems; allows up to 8 bits per pixel; GIF translators are available for most microcomputers
MacPaint	72-dpi bitmapped images	Widely supported, even by some IBM PC graphics and publishing programs
PICT	Bitmapped or object-oriented graphics	Usually used to transfer object-oriented graphics between programs
RIFF	Bitmapped images, especially scanned ones	Developed by Letraset and used by ImageStudio and ColorStudio; supported by QuarkXPress and DesignStudio, but not by PageMaker or most other graphics programs; files are usually smaller than TIFF counterparts
TIFF	Bitmapped images, especially scanned ones	Widely supported in both Mac and PC worlds; able to represent color and gray-scale images at virtually any resolution; files can be large

erase its pixels and create a new circle.

Not so with images created by an object-oriented, or *draw*, program. Programs such as Claris's MacDraw II treat images not as a series of bits, but as a series of drawing instructions for QuickDraw. When you draw a circle, the program stores a set of QuickDraw instructions describing the circle's characteristics. To change the circle's size, you simply select and resize it. The program then updates the circle's QuickDraw instructions. In essence, you create images not by blackening squares on graph paper, but by creating instructions that tell your pen—the electron beam in a monitor, the print wires in an ImageWriter, or the laser in a LaserWriter or typesetter—how and where to move.

The same pixels-versus-objects issue also applies to text. With paint programs, editing or reformatting text means retyping it. Draw programs let you use the same editing and formatting techniques as a word processor.

### Hard Copy Differences

Another big difference between paint and draw programs becomes evident when you print images, especially on a laser printer or typesetter. With paint programs, images are tied to a specific *resolution*, or number of dots per inch (dpi). A paint image's resolution generally matches that of the Mac's screen—72 dpi. Print a 72-dpi image on a 300-dpi LaserWriter, and you'll notice jagged-edged text and shapes. (You can even out the jaggies somewhat by using the Page Setup dialog box's Smoothing option, but the re-

sults still aren't great.)

Some paint programs let you create bitmaps with up to 300 dpi, but that isn't a perfect solution either. For one thing, a 300-dpi image is still locked into a specific resolution. For another, 300-dpi bitmaps devour memory and disk space—an 8½-by-11-inch monochrome image uses about a megabyte. The storage toll increases for color and gray-scale images.

Images created with draw programs, on the other hand, tend to use far less disk space and memory, and they're not tied to a specific resolution. You can print the same image on an ImageWriter, LaserWriter, or 2540-dpi Linotronic typesetter and get progressively better results. You're playing back the same drawing instructions each time you print, but with a progressively sharper electronic pen.

Object-oriented graphics can also be resized without the distortion and undesirable patterns bitmapped graphics are prone to. And because draw programs know that text is text, they can take advantage of the tack-sharp outline fonts used by PostScript printers, Adobe Type Manager, and Apple's forthcoming System 7.0.

### Paint or Pen?

So how do you decide whether you need a paint or a draw program? A paint program is the tool of choice when you need to create images with photographic details, fine shading, or brushlike effects. Paint and image processing programs are also required for working with scanned images, since these are always bitmapped.

All paint programs also provide tools for drawing simple shapes, for selecting a portion of an image to move or copy to the Mac's Clipboard, and for zooming in on an image to work with individual pixels. Simple monochrome paint programs offer a variety of brush shapes, a pencil tool, and a spray can for creating on-screen graffiti. Advanced color paint programs provide these tools as well as tools for obtaining charcoal and watercolor effects. For reviews of several color paint programs, see "Color Paint Revisited," *Macworld*, March 1990.

Draw programs are better suited to creating line drawings such as architectural floor plans, newspaper graphics, and technical drawings. Programs like MacDraw II and Deneba Software's Canvas provide features that help you create drawings to scale. In most draw programs you'll also find *dimensioning* features that automatically display an object's dimensions in your choice of measuring systems. *Layering* features let you divide a drawing into layers you can selectively show or hide, and *symbol libraries* let you store and retrieve often-used shapes. Both MacDraw II and Canvas approach the power of *computer-aided design*, or *CAD*, programs—sophisticated drawing programs used by engineers and architects (see "Getting Started with CAD," *Macworld*, August 1988).

Adobe Illustrator 88 and Aldus FreeHand approach drawing from the standpoint of a graphic designer, not a draftsman. *Macworld's* technical illustrations (such as "Painting versus Drawing") are produced using Free-



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## Crazy Characters

Aldus FreeHand and Adobe Illustrator 88 let you create interesting text effects. At top is a zoom effect; below that, text bound to a curved path; at bottom, a stroke-and-fill effect, in which characters are outlined with one type of pen (here, a 1-point-wide black pen) and then filled in with a color or pattern. The reflection effect was created by duplicating the words *Stroke&Fill* and then using FreeHand's reflect tool to create a mirror image below the original text. Finally, the skewing tool was used to angle the text's reflection.

Hand or Illustrator 88. You won't find automatic dimensioning or symbol libraries in these programs, but you will find extensive text-manipulation features that let you take full advantage of PostScript's printing prowess. For example, both programs can create *graduated fills*—patterns in which one shade smoothly blends in to another. (The shading that appears behind the text in *Macworld* sidebars is a graduated fill.) FreeHand can also *bind* text to an arbitrarily shaped path—handy for printing text in a circle on the label of a phonograph album. "Crazy Characters" shows other text effects both programs can create.

Both also let you choose colors based on the Pantone Matching System, the printing industry's most popular color-specification system. Several paint programs support Pantone colors, too. (For a comparison of several drawing programs, see "Draw, Pardner," *Macworld*, August 1989.)

## Mixed Media

Fortunately, choosing between paint and draw isn't an either/or proposition. A number of programs, including Deneba's Canvas and UltraPaint and Silicon Beach's SuperPaint 2.0, combine painting and drawing features. You can also move images between separate paint and draw programs using the Clipboard. You might paste a bitmapped image into a drawing program to annotate it with text or

to trace it to create an object-oriented version. You can also paste an object-oriented drawing into a bitmapped program, but it will become just another bitmap floating in a sea of pixels.

Several drawing programs also provide *autotrace* features that enable you to create an object-oriented version of a bitmapped image. For example, you might scan your corporate logo, and then autotrace the resulting bitmapped image.

And remember, you can combine paint or draw programs with other types of software. You can use the Clipboard to paste images into word processors, page-layout programs, data managers, and any other program that supports graphics. You can also use disk files instead of the Clipboard to shuttle images. If you take this route, familiarize yourself with Macintosh graphics-file formats to choose the one that will represent your image accurately and take up the least amount of storage space (see "Storing Pictures").

Finally, if you're serious about electronic art, you might consider supplementing your mouse with a *graphics tablet*, such as Personal Writer's PW10 SL or Wacom's SD-420L. Graphics tablets have a flat surface (usually 12 by 12 inches or thereabouts) upon which you draw using a pencil-like *stylus* (see Reviews, *Macworld*, April 1990). The Wacom tablet is especially appealing: its wireless stylus responds to pressure. When used with Adobe's Photoshop or Deneba's UltraPaint (at this writing, the only programs that support the tablet's pressure-sensitive feature), you can press harder and get darker or wider lines. Many artists find graphics tablets more natural than the mouse for drawing and tracing.

But beware—if you think graphics programs are appealing when used with a mouse, wait until your friends start scribbling with a stylus. They may never go home. **M**

See *Where to Buy* for contact information.

*Jim Heid is a Macworld contributing editor who each month focuses on a different aspect of Mac fundamentals. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh (Brady Books, 1989).*



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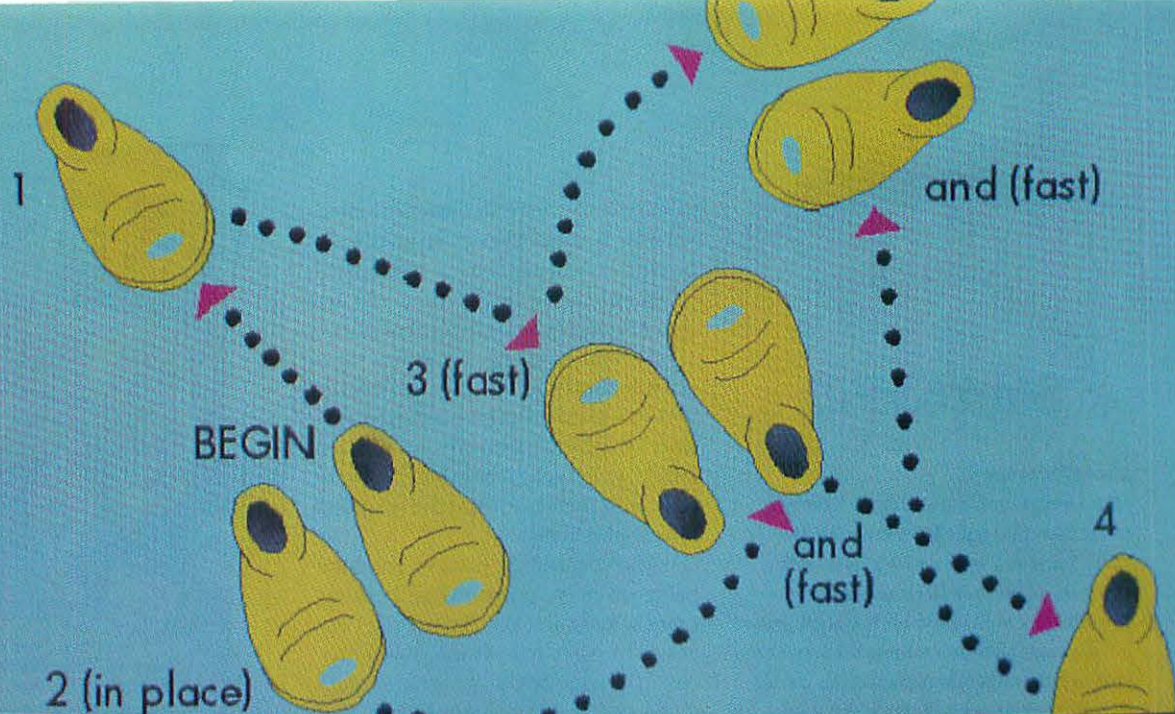
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**T**he revolutionary SuperPaint combined the

tool, text and object rotation, customized tool and palette settings, the ability to edit bitmapped images at a variety of resolutions in SuperBits, and the ability to place TIFF files in documents. The following tips will help you make use of these and other new features found in SuperPaint 2.0. Thanks are due to Cindy Taylor and Maurice Rizzuto at Silicon Beach Software for their help in rounding up tips.

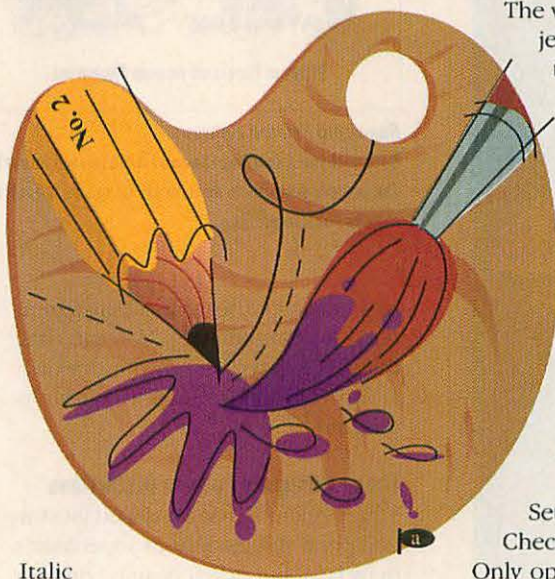
SuperPaint's otherwise ample manual is a little skimpy on information about Capture Defaults. This handy command records the settings for any number of menu items, dialog boxes, and interface options, making your customized setup automatically appear every time you open a new document. Capture Defaults captures, among other things, which layer is on top; the shape and position of floating windows (the tool window, for example); AutoTrace settings; Scale Selection settings; whether to draw from corner or center; and the initially selected font, tool, pattern palette, arrow style, brush shape, line and fill pattern, and line width.

Italic font selected, and the tool window positioned in a horizontal strip at the bottom of the document. When you've set all the attributes you want, choose Capture Defaults from the Options menu. The next time you open a new SuperPaint document, the captured settings will be in effect.

ment as a Capture Defaults template; if your needs change, you can open the template and change selected default conditions without disturbing the others you've set.

The white portions of a paint object become transparent when the object is cut or copied to SuperPaint's draw layer. The Tips and Techniques section of SuperPaint's manual shows how to use the program's free-hand bezier tool to create a mask for an object, making it opaque. Rather than trace the object by hand, you can let SuperPaint's AutoTrace command do the work for you.

- The paint object now has a white  
(continues)







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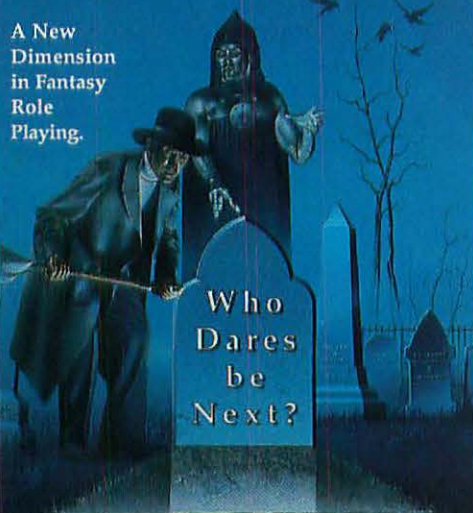
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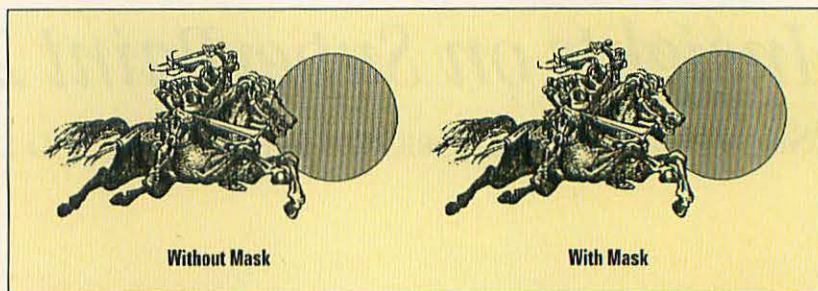
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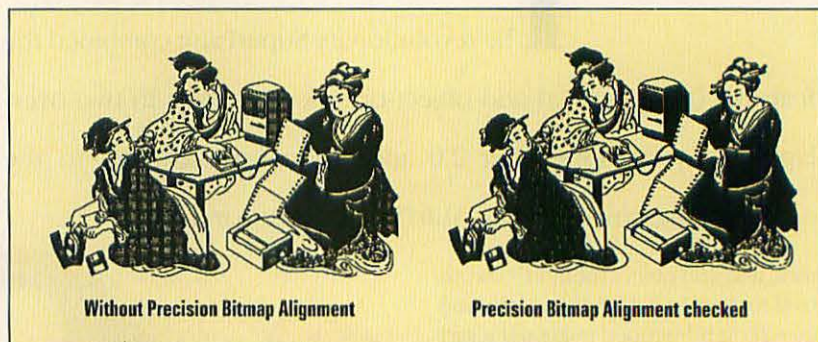
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## INSIGHTS HOW TO



### Automask

Although a paint image cut to SuperPaint's draw layer has transparent white areas, you can use the AutoTrace feature to quickly create a mask that blocks out background objects.



### Repairing Printed Patterns

Both of these SuperPaint images were pasted into a MacWrite 5.0 document and printed on a LaserWriter. The pattern distortions seen in the image on the left disappear when the Precision Bitmap Alignment box is checked before printing.

background rather than a transparent one (see "Automask"). You can drag the object anywhere in the drawing, and background objects won't show through.

### Those Unsightly Pattern Distortions

You might find that a reduced illustration prints flawlessly from SuperPaint's draw layer but develops ugly bands or checkerboard patterns when you paste it into another program and print it on a LaserWriter (see "Repairing Printed Patterns").

The solution is simple. Go into the other program's Page Setup dialog box, click the Options button, and check the box labeled Precision Bitmap Alignment. This option tells the LaserWriter to reduce a document by 4 percent to prevent the distortion that occurs when a 72-dpi image is printed at 300 dpi (since 72:300 is not an even ratio). The Precision Bitmap Alignment option is checked by default in SuperPaint, but it may not be checked in other applications, such as word processors.

### Scanner Tips

SuperPaint requires more memory to open a scanned image saved in PICT format than to place the same image saved in TIFF 1-bit format. Therefore, if you can't open a scanned PICT file, try rescanning the image and saving it in TIFF format.

To use scanned images with SuperPaint, follow these steps.

1. Make sure you scan the image at the resolution of your printer: 300 dpi for the LaserWriter, 216 dpi for the ImageWriter LQ, or 144 dpi for the ImageWriter I or II.

2. Save the scanned image in TIFF 1-bit (black-and-white) format.

3. Open SuperPaint and choose Place from the File menu. Select the appropriate TIFF file in the list that appears and click on Open. The TIFF image is automatically placed into SuperPaint's draw layer as a SuperBits object, which can be edited at any resolution.

4. To modify the image, select it and choose Edit SuperBits from the Draw menu. Although the SuperBits



image appears in the paint layer, you can use the editing tools from both the paint and draw layers to work in SuperBits.

### Stacks of Pattern Palettes

SuperPaint provides three different pattern palettes. If you don't like the patterns that are offered, you can edit them to create your own. In case that's not enough, the program has an empty pattern palette that you can fill with your own patterns. If you're *still* hankering for more patterns, you can add more blank palettes with Apple's ResEdit utility. (You can get ResEdit from your local Apple dealer or Mac user group.)

The obligatory ResEdit caveat is in order: make sure you try out this tip on a copy of SuperPaint, not on the original master disk. Although it's not likely to happen, a slip of the mouse in ResEdit could wipe out all life in this hemisphere (or at least damage your program).

1. Double-click on ResEdit to open it.

2. Scroll the ResEdit window until you see SuperPaint listed, then click on SuperPaint, and choose Open from the File menu.

3. From the list of SuperPaint resources that appears, select PAT# and choose Open from the File menu (or double-click PAT# if you're fond of shortcuts). Three sets of patterns and a blank pattern palette will be displayed.

4. Click on the blank palette to select it. Choose Duplicate from the Edit menu. Duplicate the blank palette as many times as you wish for additional palettes.

5. Close all open windows and click on Yes when ResEdit asks if you want to save your changes.

That's it. Now when you open a new SuperPaint document, it will contain the extra blank palettes you created. (If the additional pattern palettes aren't there, quit SuperPaint and return to the Finder. Throw away the SuperPaint Prefs file and reinstall the Prefs file from your SuperPaint disk. Or create a new Prefs file by clicking on New in the Specify Preference File dialog box.) When you fill the new palettes with patterns, the patterns will appear only in the document in which

they were created—unless you follow the directions in the next tip.

### Customizing Tools in the Void

SuperPaint 2.0 lets you customize patterns, brush shapes, arrows, and dashed lines. If you make changes to any of these items while working on a document, the new attributes apply only to that document. You can, however, make changes that affect all SuperPaint documents by following these steps:

1. First open a new SuperPaint document.

2. Immediately close the document. Although no drawing window is displayed, SuperPaint's menus and tool windows are still active.

3. Make any changes you wish to patterns, brush shapes, arrows, and dashes. When no document is open, these changes become part of the SuperPaint Prefs file, which are then applied to all SuperPaint documents you subsequently create.

### Shortcuts

The following shortcuts should make you a more efficient SuperPainter.

**Quick-Click Eraser** To quickly erase an object in the paint layer, choose the lasso tool and double-click on the object to select it. Then press the Delete or Backspace key to send the selection to that Big Bit Bucket in the Sky. (Note: This technique works only with shapes that have a continuous outline.)

**Nudge Nudge, Wink Wink** Use the arrow keys to nudge an object you've selected up, down, left, or right in one-pixel increments.

**Speedy Options** If you're repeating certain actions, you can bypass dialog boxes with keyboard shortcuts. For example, if you're aligning a group of objects in the draw layer, you needn't select the Align Objects command and apply the appropriate setting to each object. Instead, hold down the Option key and choose Align Objects to apply the current settings in the Align Objects dialog box to all selected objects (an even speedier method is to press ⌘-Option-M).

The Option-key shortcut also works with the Scale Selection and Rotate Selection commands, the Other

(continues)

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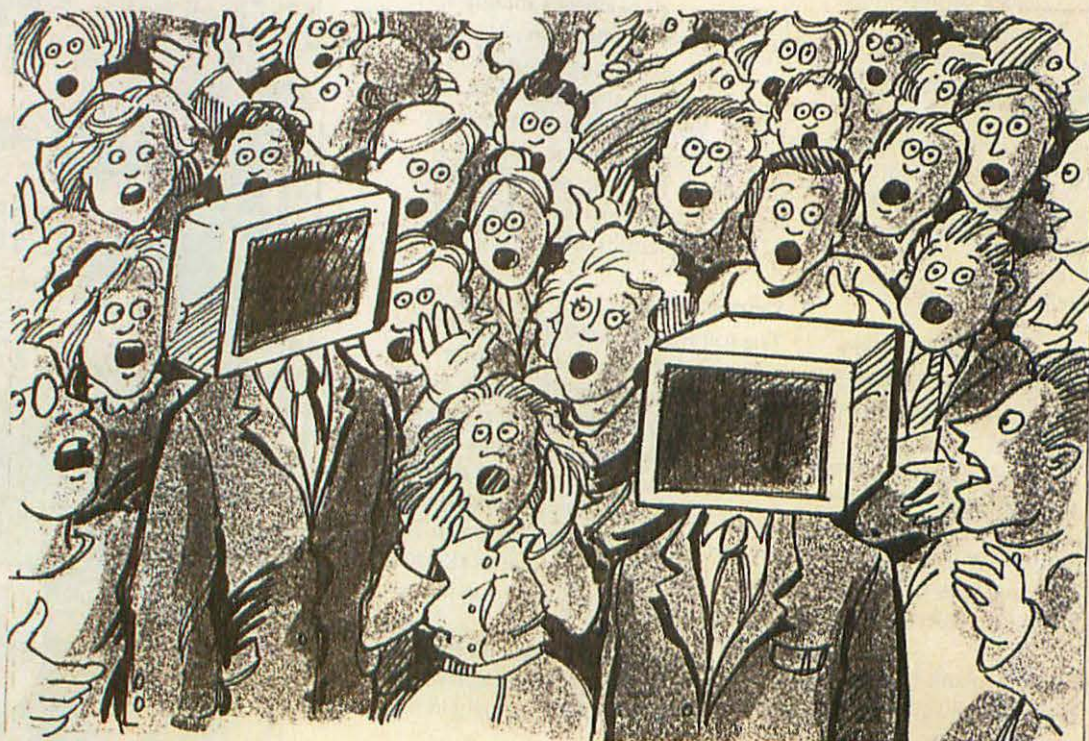


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### MACWORLD Expo/Boston Hotline 617-361-3941

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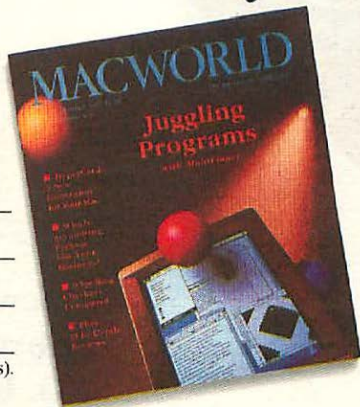
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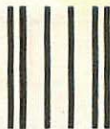


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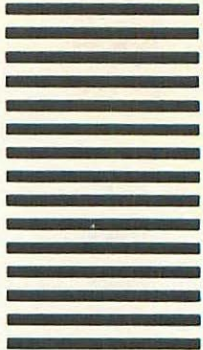
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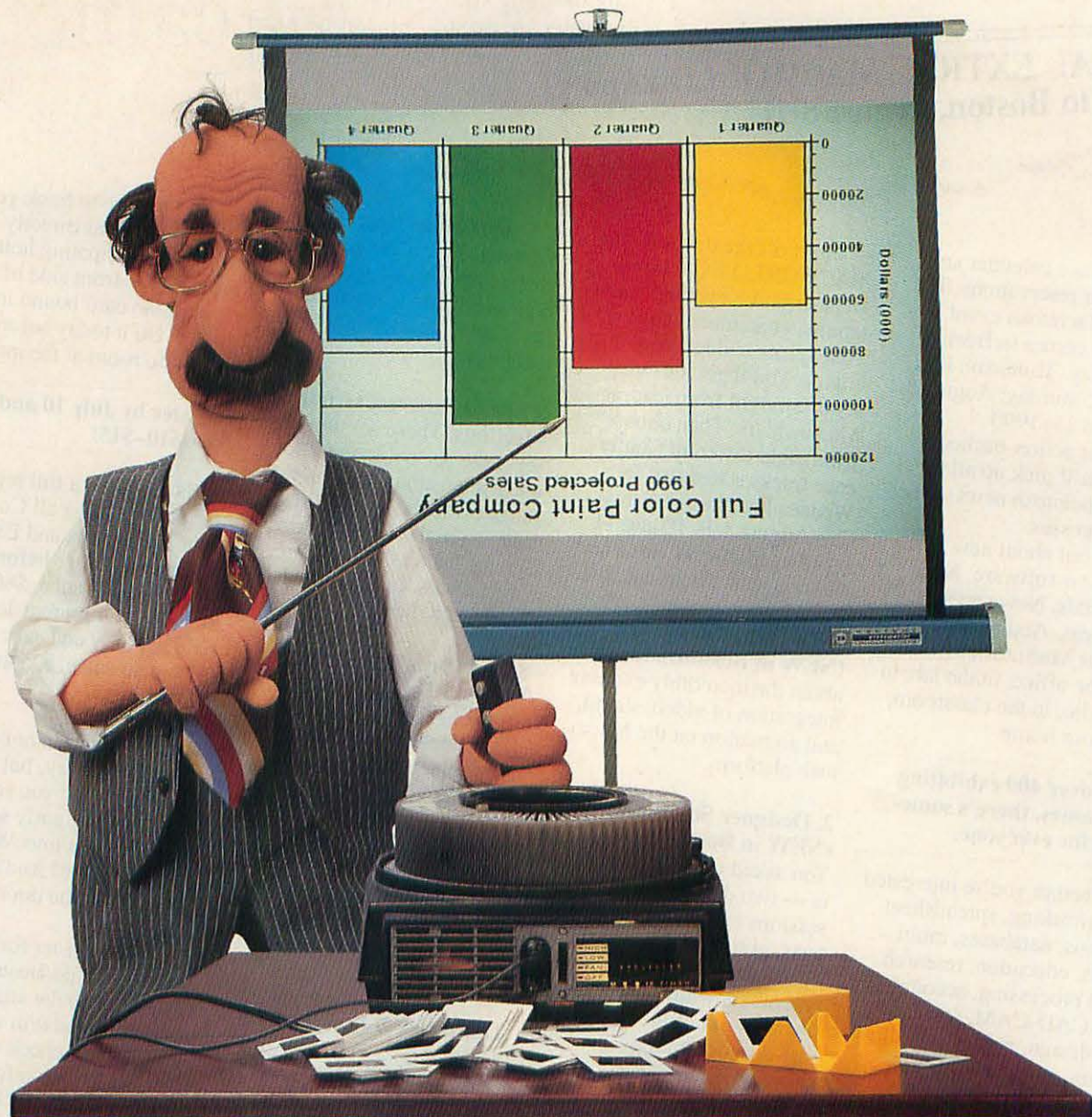
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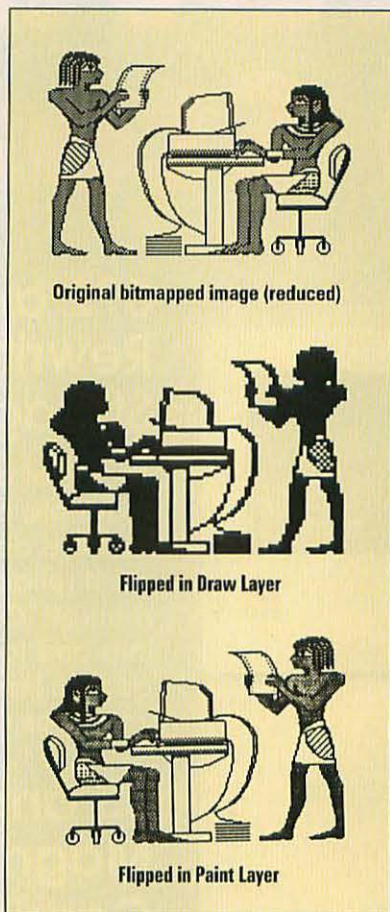
### Avoiding Bitmaps on QuickDraw Printers

If you cut or copy a bitmapped image from SuperPaint's paint layer to the draw layer and then reduce it, you'll get a crisp image that takes advantage of a laser printer's resolution. Once the bitmap is in the draw layer, you can use the Transform menu to flip, rotate, or stretch it. Unfortunately, a QuickDraw printer such as the ImageWriter LQ or the LaserWriter IISC doesn't support objects that are transformed in the draw layer, and will print them as 72-dpi bitmaps rather than high-resolution draw objects. Fortunately, you can fool a QuickDraw printer into printing a transformed object at the printer's maximum resolution.

To do so, you must first perform the transformation in the paint layer (use a large image, since you'll be reducing it later). For example, you could select a bitmapped graphic in the paint layer and choose Flip Horizontal from the paint layer's Transform menu. Next, choose Cut to Drawing from the Edit menu to transfer the flipped image to the draw layer. The printer then treats the graphic as a bitmapped object—which means it can be scaled to take advantage of the printer's resolution. To improve the graphic's appearance, choose Scale Selection in the draw layer and scale it to 50 percent (see "Draw Object Lesson").

### Faster PostScript Printing

If your laser printer seems to take forever to print a SuperPaint document, try turning off Text Smoothing and Graphics Smoothing in the Page Setup dialog box. (This action makes bitmapped text and graphics appear somewhat jagged, so you must decide whether the time saved justifies the difference in print quality.)



### Draw Object Lesson

The image in the middle was cut from the paint layer to the draw layer, scaled to 50 percent, flipped horizontally, and printed on a LaserWriter IISC. The image on the bottom was flipped horizontally in the paint layer, cut from the paint layer to the draw layer, scaled to 50 percent, and printed on a LaserWriter IISC. The order makes all the difference.

### Sharing the Wealth

If you've discovered a tip, shortcut, or workaround that wasn't mentioned here, spread the word to other Macworld readers by sending it to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. ☐

See *Where to Buy* for contact information.

*Erfert Fenton is a Macworld contributing editor whose beat is fonts and graphics software. She is the author of The Macintosh Font Book (Peachpit Press, 1989) and coauthor of Canned Art: Clip Art for the Macintosh (Peachpit Press, 1990).*

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# UPDATES

Here's our list of the current shipping versions of Mac software at the time we went to press. We hope you'll find it useful—because these days, keeping track of the latest CPU is tough enough.

**Colleague 2** includes a copy of the run-time version of 4th Dimension; has user-definable fields in the client records; and can generate searches, sorts, and reports. Runs faster than earlier versions. Colleague, 512/345-9964. \$35 upgrade; \$395 new.

**Property Management III** is a stand-alone version with complete accrual accounting; ability to generate additional reports; and integrated Accounts Receivable, Accounts Payable, General Ledger, and Property Profile modules. Real Data, 203/838-2670, 800/899-6060. \$100 upgrade; \$395-\$1495 new.

**SAM version 2.0** includes an Instant Update feature that lets customers add immediate protection against newly discovered viruses by calling a 24-hour

Virus Newline. Automatically scans for infections and ejects infected floppy disks. Symantec, 408/253-9600. \$29.95 upgrade; \$99.95 new.

**WriteNow version 2.2** includes 1.4 million-word WordMaster thesaurus DA and 135,000-word dictionary. Includes a Preferences Dialog that gives the user options to view menu fonts and ruler guides and to save window locations. T/Maker Software, 415/962-0195. \$49 upgrade; \$199 new.

## PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
1st Aid Kit ★	2.8	512K/3.0	*	
4th Dimension	2.0	1MB/6.02	3/90	*
Aatrix CheckWriter II ★	2.01	512K/4.1		\$10
Aatrix TimeCard	2.0	512K/4.2		Free
Accountant Inc.	2.1	1MB/6.02		\$9.50
ACCPAC Bedford	1.1	1MB/5.1		\$50
Simply Accounting				
AccuText ★	1.1	4MB/6.02	2/90	*
Adobe Type Manager	1.2	1MB/6.02	2/90	Free
AdWriter	2.0	1MB/6.0		Free
After Dark	1.1	512K/3.2	7/90	\$5
Alchemy	1.1	1MB/6.0		\$25
Aldus FreeHand	2.0	1MB/6.03		*
Aldus PageMaker	2.02	1MB/4.1		*
Aldus Persuasion	2.0	1MB/6.0		*
AmiPack Plus ★	4.2.2	512K/3.2	1/90	\$29.95
Analog Connection	3.0	1MB/5.0	5/90	\$50
WorkBench				
Anatool ★	3.1	512K/3.0		\$35
AntiToxin	1.3	1MB/6.0.2	1/90	\$15
APL 68000	7.0	512K/3.2		*
AppleShare File Server	2.0	512K/3.2		*
Archie	2.0	1MB/6.0		\$75
ArchiText	2.0	1MB/6.02		Free
Aristotle's Politics	2.0	2MB/6.03		Free
The Art Importer	2.0	1MB/6.0	5/90	\$20
ArtRoom	3.0	512K/3.2		\$199
AutoCalc	2.0	1MB/6.0		\$95
AutoSave II	1.1	512K/4.2	7/90	\$7.50
Aztec C	3.6	512K/4.2		*
BackFax ★	1.02	1MB/6.03	1/90	Free
Back to Basics: Professional	2.0	512K/3.2		\$75
Ball & Stick ★	2.2	1MB/6.0		Free
Bill-It	2.0	1MB/6.03		\$29
Bridge	6.0	512K/3.2		\$17

Product	V.	Req.	Rev.	Price
Business FileVision ★	1.5	1MB/6.02		*
Business Sense ★	1.2	1MB/6.0		*
Business Session ★	3.2	512K/3.2		Free
CA-Cricket Presents	2.0	1MB/6.0		Free
Calculator	2.06	512K/3.2	4/90	\$25
Construction Set ★				
CanOpener	1.1	512K/3.0		Free
Canvas	2.1	1MB/6.0		*
Capture	2.0	1MB/6.0	2/90	\$15
Central System Manager	2.1	1MB/5.0x		*
ChromaScan	1.1	4MB/6.02		Free
Client/Mac	2.0	1MB/6.0		\$370
Colorset ★	1.5	1MB/6.0	6/90	Free
Colleague 2	2.1	2MB/6.03		Free
Comment	2.02	1MB/6.0		*
Commtext	2.0	1MB/6.0		Free
Compielt	1.5	1MB/6.02	3/90	Free
CompuServe	2.1	512K/3.2		*
Navigator ★				
Computerized Classic Accounting	2.2	1MB/6.0		*
ConcertWare	5.1	512K/4.2		\$35
Control	1.5	1MB/4.1		Free
CopyFlow	2.0	2MB/6.0	6/90	Free
Cue	3.0	1MB/6.03		*
Data Desk	3.0	512K/4.02	6/90	\$125
DataMerge	2.0	512K/3.2		Free
dBase Mac ★	1.01	1MB/4.1		Free
Deluxe Music	2.5	512K/6.02	9/89	*
Construction Set				
D.E.S.	4.0	1MB/6.0		*
Design Dimensions ★	2.15	5MB/6.03		Free
DeskPaint ★	2.1C	512K/4.2	5/90	Free
DiagramMaker ★	1.1	1MB/6.02		*
Digital Darkroom	1.1	1MB/6.02		Free
DiskFit	1.5	512K/4.1	12/89	\$30
DiskTop	4.0	1MB/6.0		*

Product	V.	Req.	Rev.	Price
Display AdBuilder	1.1	1MB/6.03		*
Dollars and Sense	4.1	512K/3.2		*
DragonWave	1.1	1MB/6.03		*
Dreams	1.1	1MB/6.02		*
DynaPerspective	2.0	2MB/6.04		Free
Dynadex ★	1.1	1MB/6.0	6/90	Free
Easy Color Paint	1.1	1MB/6.0		*
Empower ★	2.05	1MB/5.0		Free
Empower II ★	3.0	1MB/5.0		*
EndLink	1.1	512K/3.2		Free
EndNote	1.2	512K/3.2		Free
Extender GrafPak	3.0	1MB/6.02		\$30
Falcon	2.2	1MB/3.2		\$3
Fastback II	2.1	512K/4.1	12/89	\$30
Fast Forms	2.0	512K/3.2		\$25
Ferrari Grand Prix ★	1.6	512K/3.2		\$10
FetchIt	2.0	512K/6.01		*
FileMaker II ★	1.1	1MB/4.2		*
Finale	2.0	1MB/6.02	5/90	Free
Financial Analysis	3.0	512K/3.0		*
Findswell	2.01	512K/3.2	3/90	*
Fontographer	3.0	1MB/6.0	5/90	*
FontShare	2.0	1MB/6.0		Free
FormsProgrammer ★	2.03	1MB/6.02		\$15
FoxBase+/Mac ★	2.10	1MB/6.0		\$75
Freedom of Press ★	2.2	1MB/6.0		Free
FreeFlow	3.0	1MB/6.03		Free
Full Impact ★	1.1	1MB/6.0		Free
FullWrite	1.1	2MB/6.02		Free
Professional ★				
Gofer ★	2.01	1MB/4.1		\$25
GOL	2.0	1MB/5.0		*
Great Plains	5.2	1MB/6.0		*
Accounting Series				
Help DA	3.0	1MB/6.0		Free
HFS Backup	3.0	512K/3.2	8/89	\$35
Hybase ★	1.1	1MB/6.0		Free

(continues)

**Bold** = first time the product is being listed.

★ = minor update.

**Req.** = min. RAM and system software required.

**Rev.** = last time (in past year) reviewed this or an earlier version.

**Price** = cost for update to registered owners.

\* = contact your dealer for update policy.



## PRODUCT UPDATES

Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.
HydroMac	2.0	1MB/6.0	*		Instant-Expert Plus	3.0	1MB/5.0	Free		MacDraw II	1.1	1MB/6.0	*
HyperAnimator *	1.5	1MB/6.03		\$29.95	JetLink Express *	1.01	1MB/6.0	Free		MacEnvelope	5.0	512K/3.2	\$25
HyperCard *	1.2.2	1MB/6.03		\$10	KidsTime *	1.2	512K/3.2	\$15		MacEnvelope Plus	2.0	512K/3.2	1/90 \$50
HyperDA *	1.2	512K/3.2		\$10	KiwiEnvelopes	3.0	512K/4.1	\$10		MacFalcon	2.1	1MB/6.03	*
HyperEngine	1.1	1MB/6.03		Free	LAN Package	3.1	1MB/6.0	*		MacFlow	3.0	1MB/6.03	\$30
Developer's Tool *					Language Systems	1.2	1MB/6.03	*		MacFortran	2.4	512K/4.2	*
HyperLibrary	2.0	1MB/5.0		*	Fortran Compiler *					MacFortran/020	2.4	512K/4.2	*
HyperPort Chess	2.0	1MB/6.0		\$10	LapLink Mac III	3.0	512K/2.0	7/90 *		MacFortran for MPW	1.1	2MB/6.02	Free
HyperWindows *	1.2	1MB/6.02		\$20	LaserPaint Color II *	1.02	1MB/6.03	Free		MacHerbal	2.0	512K/3.2	\$49
Icon-It	2.0	1MB/6.02		\$29	LetraStudio	1.5	2MB/6.0	\$45		MacHotel	3.3	1MB/6.03	Free
Iconia *	7.0	1MB/6.0		*	LetrTuck+	2.0	512K/3.2	\$20		MacLine	3.0	512K/3.0	\$25
Igor *	1.1	1MB/6.0	5/90	Free	Lookup	2.0	1MB/6.0	5/90 \$15		MacLinkPlus/	4.0	512K/3.2	\$45
Image Grabber	2.0	1MB/6.02		Free	LXR.TEST*	4.0.11	1MB/6.0	Free		Wang VS			
ImageStudio	1.5	1MB/6.0		\$99	Mac86	2.0	1MB/6.02	\$10		MacMainFrame	2.1	2.5MB/6.02	\$100
ImageWriter LQ	2.0	512K/3.2		Free	Mac286	2.0	1MB/6.02	\$10		3270/CUT			
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Accounts Payable					MacClassAds	4.0	1MB/6.0	*		MacRecorder	2.0	512K/3.2	12/89 *
Insight Expert	2.2	1MB/6.02		*	MacClient *	1.1	1MB/5.0	Free		MacSafe II		512K/4.2	*
Accounts Receivable					MacConcept	3.0	1MB/6.03	*		MacSchedule	2.0	1MB/6.0	\$30
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MacTell	3.5	512K/3.0		*	Microsoft Word	4.0	512KE/3.2	10/89	*	Nisus	2.0	1MB/6.02	9/89	Free
MacTerminal ★	2.31	512K/3.2		Free	Microsoft Works	2.0	512K/6.0		*	NoPaint ★	1.04	512K/3.2		Free
MacToPic	2.0	1MB/6.0		\$25	MindWrite ★	2.1	512KE/4.2		*	Nutrition Stack	2.0	1MB/6.02		\$20
MacVision	2.1	1MB/4.2		*	MiniCad +	2.0	1MB/6.0	11/89	*	OmniPage ★	2.1	1MB/6.02	2/90	Free
MacWrite II	1.1	1MB/6.0		Free	MiniDraw	4.0	512KE/4.2		\$17	Omni 3 Plus/Express	2.0	512KE/3.2		*
Managing Your Money	3.0	1MB/6.03	6/90	\$49.95	MockPackage Plus	4.4	512KE/3.2		\$15	On Schedule	2.0	1MB/3.0		*
MapGrafix	2.0	4MB/6.03		Free	Utilities					P51 Mustang	2.04	512K/3.2		\$10
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MathType	2.1	512K/6.02	11/89	*	More II ★	2.01	1MB/4.1		Free	PEGASYS II	3.2	1MB/6.03		Free
Matlab	1.2	1MB/3.0		*	MSFL: Pro League	2.0	1MB/6.0		*	Performer Sequencer ★	3.2	1MB/6.0		Free
MaxPage ★	1.2	512K/3.2		Free	Football					Personal Golf Stats	2.0	512K/3.2	2/90	Free
McClint	2.0	1MB/4.2		\$25	MultiClip	2.1	512K/6.02		*	Personal Reference	2.0	1MB/6.0		\$10
McPrint	2.0	512K/4.2		\$25	MultiLedge ★	1.1	512K/3.2		Free	Catalog				
McMax	2.0	1MB/5.0	8/89	*	Multi-User	3.01	512K/3.2		*	Personal Phone ★	1.1	1MB/6.0		*
Memorybank Manager	3.0	1MB/6.0		Free	Appointment Diaries					The Phrase	2.0	1MB/6.0	6/90	Free
Mesa Graphics	1.03	512KE/5.0		*	Music Publisher	2.03	1MB/6.0		Free	Thesaurus				
Plotter Utility					MyTimeManager	2.0	1MB/6.0	5/90	*	PICT Detective	2.0	512KE/6.0		\$20
MGMStation ★	2.5	512KE/3.0		*	Navigate	2.0	1MB/6.0		Free	PixelPaint	2.0	2MB/4.1		\$99
MicroPhone II	3.0	512KE/4.2	7/90	*	Nemesis Go Master	4.0	512K/4.1		*	Plans & Simple ★	1.05	1MB/3.2		*
Microsoft File	4.0	512K/3.2		*	Network DiskFit	1.5	512K/4.1	12/89	\$30	PowerDraw	3.0	1MB/6.0		*
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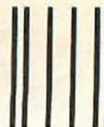
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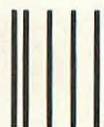
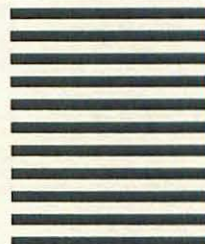
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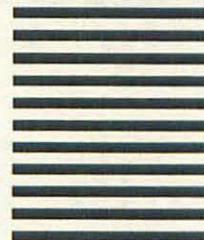
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Reports ★	1.2	1MB/6.0		Free	TMON ★	2.8.4	512K/4.0		*
Retail Engine	3.0	1MB/6.0		*	TOPS/Mac	3.0	512K/3.2		*
Sales Associate	1.10	1MB/6.03		Free	Trapaze ★	2.1	1MB/6.0		\$35
Sales and Market	2.0	1MB/6.0		\$49	TrueBASIC ★	2.02	1MB/6.0		Free
Forecasting Toolkit					TrueForm ★	1.1	1MB/6.2	4/90	Free
SAM	2.0	1MB/6.0	1/90	\$29.95	Turbosynth	2.0	1MB/6.03		\$35
ScheduleMaker ★	3.01	1MB/6.0		\$25	Typeface Library	1.5	1MB/6.03		*
ScreenSnap ★	2.2	1MB/4.2		*	TypeStyler	1.01	1MB/4.1	7/90	*
ScriptEdit	1.1	1MB/6.04	3/90	*	UNITize ★	1.3	512KE/3.2	10/89	\$20
Second Sight	2.0	1MB/6.02		\$33.75	UpBeat	2.0	1MB/6.0		\$75
Sentinel	2.2	1MB/6.0	8/89	\$30	VersaCAD/	2.11	1MB/6.0		Free
Shanghai	2.0	1MB/6.02	2/90	\$13	Macintosh Edition ★				
SimpleSpan	2.5	512K/3.2		*	Vietnam War	2.0	1MB/6.0		*
Smart Alarms	2.9.1	512K/3.2		\$12	Virex ★	2.5.1	1MB/4.2	1/90	*
SmartForm	1.1	1MB/6.0		Free	Virtual	2.0	1MB/3.2	10/89	Free
Assistant ★					Vision	1.1	1MB/6.03		Free
SmartForm Designer	1.1	1MB/6.0		Free	Voyager	1.2	1MB/6.0	4/90	*
SmartScrap &	2.0	1MB/6.03	8/89	\$20	VMacS	2.0	1MB/6.0		\$25
The Clipper					Wall Street Investor	3.0	1MB/5.0		\$150
Snap ★	3.1	1MB/3.0	9/89	*	White Knight II	11.6	1MB/6.02	7/90	\$35
SoftPC ★	1.3	2MB/6.0	9/89	*	Wings ★	1.1	1MB/6.0		Free
Sound Designer	1.5	512K/6.03		\$45	Word Finder	2.0	512K/3.2		*
Universal ★					WordPerfect for	1.0.3	1MB/4.2		Free
Spelling Coach	3.1	512KE/4.2		*	the Macintosh ★				
Professional					WorksPlus Spell	2.0	1MB/6.03	1/90	*
SpelloWell ★	2.2	512K/3.2	5/90	\$20	WriteNow	2.2	512K/4.2		\$49

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates*, Macworld, 501 Second St., San Francisco, CA 94107.

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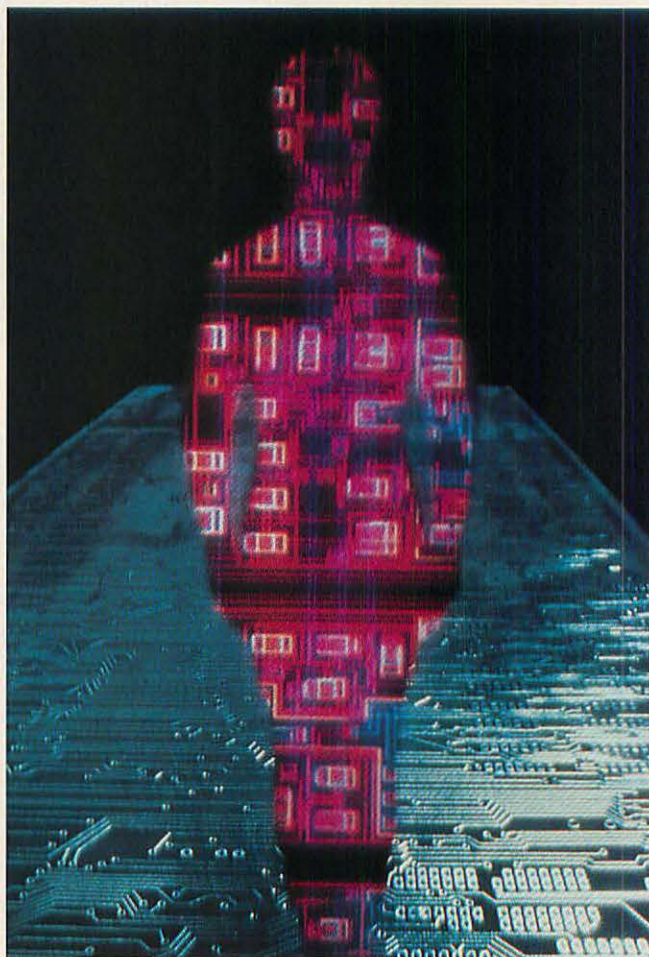
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# WHERE TO BUY

A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

## Reader Service

- 701 19" Color Display** SuperMac Technology; 408/245-2202.
- 702 19" Trinitron Color Display** SuperMac Technology; 408/245-2202.
- A**
- 703 Adobe Illustrator** Adobe Systems, Inc.; 415/961-4400, 800/833-6687.
- 704 After Dark** Berkeley Systems, Inc.; 415/540-5536.
- 705 Aldus FreeHand** Aldus Corp.; 206/628-2320.
- 706 Aldus Persuasion** Aldus Corp.; 206/628-2320.
- 707 American English Writing Guide** Nova Development Corp.; 818/992-3222, 800/950-6682.
- 708 America Online** Quantum Computer Services, Inc.; 703/448-8700, 800/227-6364.
- 709 Aperture Visual Information Manager** Aperture Technologies, Inc.; 203/975-7587.
- 710 AppleColor High-Resolution RGB Monitor** Apple Computer, Inc.; 408/996-1010.
- 711 Apple External FDHD SuperDrive** Apple Computer, Inc.; 408/996-1010.
- 712 Apple File Exchange** Apple Computer, Inc.; 408/996-1010.

## Reader Service

- 713 Architrion II** Gimeor, Inc.; 202/546-8775.
- 714 Ashlar Vellum** Ashlar; 408/746-2980.
- 715 AutoCAD** Autodesk, Inc.; 415/331-0356.
- 716 AutoSave II** Magic Software, Inc.; 402/291-0670, 800/342-6243.

## B

- 718 Bernoulli Box II for Macintosh** Iomega Corp.; 801/778-1000, 800/456-5522.
- 719 Bernoulli File Exchange** Iomega Corp.; 801/778-1000, 800/456-5522.
- 720 Blueprint** Graphsoft; 301/461-9488.

## C

- 721 CA-Cricket Graph** Computer Associates; 408/432-1727, 800/531-5236.
- 722 CA-Cricket Presents** Computer Associates; 408/432-1727, 800/531-5236.
- 723 CADD Level 1** Generic Software, Inc.; 206/487-2233, 800/228-3601.
- 724 CADMover** Kandu Software Corp.; 703/532-0213.
- 725 Canvas** Deneba Software; 305/594-6965, 800/622-6827.
- 726 ChromaVision 2-Page Display System** CalComp; 714/821-2000.
- \* Claris CAD** Claris Corp.; 408/727-8227.
- 727 CleanPath Computer Maintenance Kit** Discwasher, Inc.; 708/678-9600, 800/325-0573.
- 728 ColorBoard 708+ System** RasterOps Corp.; 408/562-4200.

## Reader Service

- 800/468-7600.**
- 729 ColorPage 15** E-Machines, Inc.; 503/646-6699, 800/344-7274.
- 730 ColorPage T16 Display System** E-Machines, Inc.; 503/646-6699, 800/344-7274.
- 731 ColorStudio** Letraset; Graphic Design Software; 201/845-6100.
- 732 Connect Business Information Network** Connect Inc.; 408/973-0110, 800/262-2638.
- 733 Cosmos/M** Structural Research and Analysis Corp.; 213/452-2158.
- 734 CT-II Generation X** Technologies, Inc.; 408/739-4570, 800/448-8231.
- 735 The Curator** Solutions, Inc.; 802/865-9220.

## D

- 736 DaynaFile** Dayna Communications, Inc.; 801/531-0203.
- 737 DeltaGraph** DeltaPoint, Inc.; 408/648-4000, 800/367-4334.
- 738 Design Your Own Home Architecture** Abracadabra; 503/342-3030, 800/451-4871.
- 739 DeskPaint & DeskDraw** Zedcor, Inc.; 602/881-8101, 800/482-4567.
- 740 Desktop Express** Dow Jones & Co., Inc.; 609/520-4000.
- 741 DiskTools Plus** Electronic Arts; 415/571-7171, 800/245-4525.
- 742 DiskTop** CE Software, Inc.; 515/224-1995.
- 743 DOS Mounter** Dayna Communications, Inc.; 801/531-0203.
- 744 Douglas CAD/CAM Professional System** Douglas Electronics; 415/483-8770.

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- 745 Drawing Table** Brøderbund Software; 415/492-3200, 800/527-6263.
- 746 Dreams** Innovative Data Design, Inc.; 415/680-6818.
- 747 Drive 2.4** Kennect Technology; 408/370-2866, 800/552-1232.
- E**
- 748 E-Machines T19** E-Machines, Inc.; 503/646-6699, 800/344-7274.
- 749 E-Machines TX** E-Machines, Inc.; 503/646-6699, 800/344-7274.

## F

- 750 Facilities Manager** Schlumberger; 313/995-6000, 800/366-0060.
- 751 Fish** Tom & Ed's Bogus Software; 15600 NE 8th, #A3334, Bellevue, WA 98008.
- 752 FlexiCAD** Amiable Technologies; 215/222-9066, 800/422-3539.
- 753 Full Impact** Ashton-Tate; 213/329-8000, 800/227-4866.

## G

- 754 Gemini 020/030** Total Systems; 503/345-7395, 800/874-2288.
- 755 The Graphics Link Plus+** HSC Software; 213/392-8441.

## H

- 756 HookUp** Hip Software Corp.; 617/661-2447.
- 757 HyperEntrepreneur** Hyper Train, Inc.; 518/834-7203.

## I

- 758 IdeaFisher** Fisher (continues)



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800/289-4332.
- 759 **ImageStudio** Letraset  
Graphic Design  
Software; 201/845-6100.
- 760 **InCAD** Infinite Graphics;  
612/721-6283.
- 761 **Irrigation Design** Land-  
CADD; 303/688-8160.

### K

- 762 **Kaleidagraph** Synergy  
Software; 215/779-0522.
- 763 **KeyPlan** Symmetry  
Software Corp.;  
602/998-9106,  
800/624-2485.

### L

- 764 **Landesign** Compuneer-  
ing Inc.; 416/738-4601.
- 765 **LapLink Mac III** Traveling  
Software, Inc.; 206/483-  
8088, 800/662-2652.
- 766 **Layouts** Starburst  
Designs, Inc.;  
702/453-3371.

### M

- 767 **MacBravo Detailer**  
Schlumberger; 313/995-  
6000, 800/366-0060.
- 768 **MacChuck PC Remote**  
**Control Program** Vano  
Associates, Inc.;  
612/788-9547.
- **MacDraw II** Claris Corp.;  
408/727-8227.
- 769 **Macify** Eric Celeste; 358  
N. Parkview, Columbus,  
OH 43209.
- 770 **MacLinkPlus/PC** DataViz,  
Inc.; 203/268-0030.
- **MacPaint** Claris Corp.;  
408/727-8227.
- 771 **MacRescue** Computer  
Care, Inc.; 612/371-  
0061, 800/950-2273.
- 772 **MacSurf** Graphic Magic;  
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- **MacWrite II** Claris Corp.;  
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- 773 **McGee** Lawrence  
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800/421-4157.
- 774 **MCI Mail** MCI; 202/293-  
4255, 800/444-6245.
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- 776 **MegaScreen 2008/19**

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- 777 **Microphone II** Software  
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- **Microsoft Chart** Microsoft  
Corp.; 206/882-8080,  
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- **Microsoft Excel** Microsoft  
Corp.; 206/882-8080,  
800/426-9400.
- **Microsoft Works**  
Microsoft Corp.;  
206/882-8080,  
800/426-9400.
- 778 **MicroStation Mac**  
Intergraph; 205/730-  
2000, 800/345-4856.
- 779 **MindLink** MindLink, Inc.;  
802/457-2025.
- 780 **MiniCad+** Graphsoft;  
301/461-9488.
- 781 **ModaCAD** ModaCAD,  
Inc.; 213/312-6632.

### N

- 782 **Network Bundle for Mac**  
TOPS; 415/769-9669,  
800/445-8677.

### O

- 783 **Origins CADD** Deltasoftware;  
918/825-4848.

### P

- 784 **Partner** Salient;  
415/852-9567.
- 785 **pcMacTerm** Dynamic  
Microprocessor  
Associates, Inc.;  
516/462-0440.
- 786 **PCPC II/19** Personal  
Computer Peripherals  
Corp.; 813/884-3092,  
800/622-2888.
- 787 **PCPC II/21** Personal  
Computer Peripherals  
Corp.; 813/884-3092,  
800/622-2888.
- 788 **PEGASYS II** IGC  
Technology Corp.;  
415/563-3612.
- 789 **Personal Writer PW10 SL**  
Personal Writer, Inc.;  
213/556-1001,  
800/322-4744.
- 790 **Photon Paint** Micro-  
Illusions, Inc.;  
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408/245-2202.
- 793 **The Playroom** Broderbund Software, Inc.;  
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800/521-6263.
- 794 **PowerDraw** Engineered Software; 919/299-4843.
- 795 **Preschool Pack** Nordic Software; 402/466-6502,  
800/228-0417.
- 796 **Pyro** Fifth Generation Systems, Inc.; 504/291-7221, 800/225-2775.

**Q**

- **QuickShare** Compatible Systems Corp.;  
303/444-9532,  
800/356-0283.

**R**

- 797 **Radius Color Display** Radius, Inc.; 408/434-1010, 800/227-2795.
- 798 **Radius Pivot Display** Radius, Inc.;  
408/434-1010,  
800/227-2795.
- 799 **RagTime 3** RagTime

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- USA; 415/780-1800.
- 800 **Rapport** Kennet Technology;  
408/370-2866,  
800/552-1232.
- 801 **Relax/Ikegami Trinitron Display System** Relax Technology;  
415/471-6112,  
800/848-1313.
- **ResEdit** APDA-Apple Computer, Inc.;  
800/282-2732.
- S**
- 802 **Sigma ColorMAX 8/24 Display System** Sigma Designs; 415/770-0100,  
800/933-9945.
- 803 **Snap** FORTHought, Inc.;  
803/878-7484.
- 804 **Soft PC** Insignia Solutions, Inc.;  
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- 805 **Studio/1, Studio/8** Electronic Arts;  
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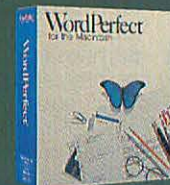
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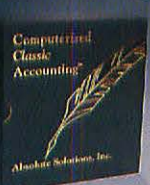
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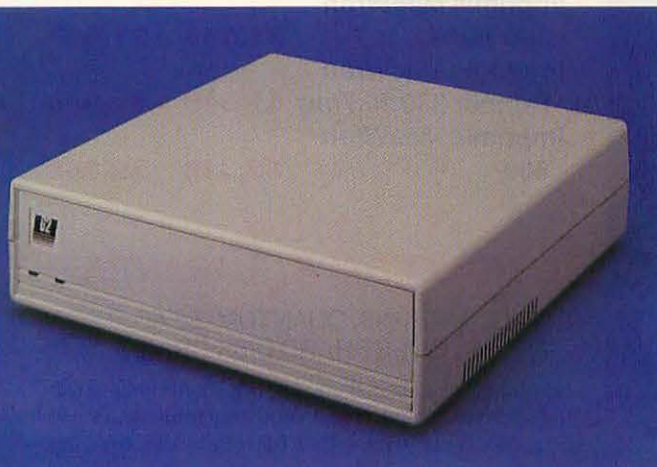


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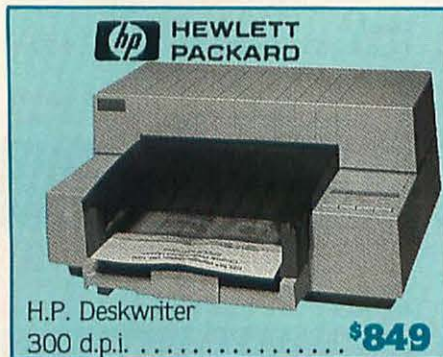
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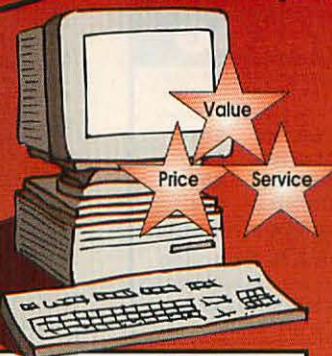
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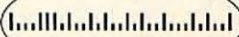
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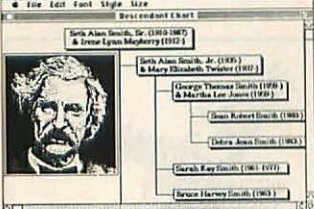
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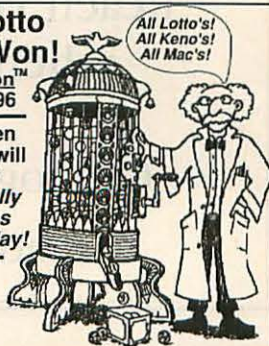
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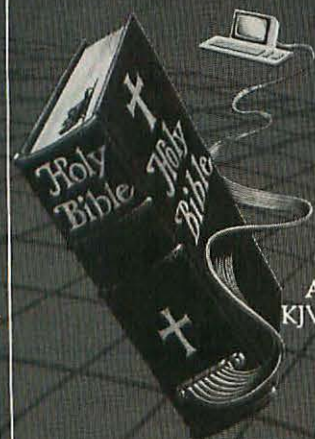


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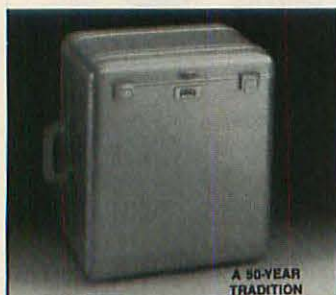
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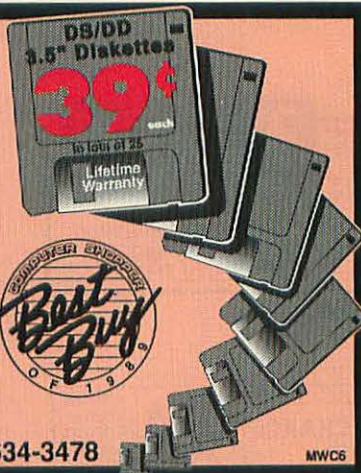
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# BEST-SELLERS

Months on chart	Last month	This month	
▼	▼	▼	
62	1	1	<b>BUSINESS SOFTWARE</b>
22	5	2	<b>Microsoft Word</b> Microsoft
3	6	3	<b>WordPerfect for the Macintosh</b> WordPerfect
41	3	4	<b>Quicken</b> Intuit
53	2	5	<b>Microsoft Works</b> Microsoft
49	4	6	<b>Microsoft Excel</b> Microsoft
38	8	7	<b>Aldus PageMaker</b> Aldus
1	—	8	<b>MacWrite II</b> Claris
15	—	9	<b>Simply Accounting</b> Computer Associates
5	—	10	<b>Adobe Illustrator 88</b> Adobe
			<b>MacInTax</b> Softview

## EDUCATION SOFTWARE

29	4	1	<b>Reader Rabbit</b> The Learning Company
45	5	2	<b>Math Blaster</b> Davidson & Associates
16	1	3	<b>Where in the World Is Carmen Sandiego?</b> Brøderbund
3	3	4	<b>Where in the USA Is Carmen Sandiego?</b> Brøderbund
7	—	5	<b>Reader Rabbit</b> The Learning Company

## ENTERTAINMENT SOFTWARE

7	1	1	<b>SimCity</b> Maxis Software
5	3	2	<b>Tetris</b> Spectrum HoloByte
42	2	3	<b>Flight Simulator</b> Microsoft
2	5	4	<b>Leisure Suit Larry in the Land of the Lounge Lizards</b> Sierra On-Line
19	—	5	<b>Falcon</b> Spectrum HoloByte

## NETWORK/DATA COMMUNICATIONS

41	1	1	<b>TOPS</b> TOPS
1	—	2	<b>Laplink Mac</b> Traveling Software
8	5	3	<b>MacLink Plus</b> DataViz
10	4	4	<b>Netware for the Macintosh</b> Novell
2	—	5	<b>MicroPhone II</b> Software Ventures

Months on chart	Last month	This month	
▼	▼	▼	
33	4	1	<b>HARD DISKS*</b>
5	3	2	<b>Apple Hard Disk 20SC</b> Apple Computer
7	5	3	<b>MacStack SD40</b> CMS Enhancements
1	—	4	<b>Apple Hard Disk 40SC</b> Apple Computer
1	—	5	<b>Cutting Edge External 30MB</b> Cutting Edge
			<b>MacStack SD80</b> CMS Enhancements

## ADD-IN BOARDS/MEMORY

31	2	1	<b>Radius Accelerator</b> Radius
2	1	2	<b>ColorBoard 264</b> RasterOps
18	5	3	<b>Radius Interface Display</b> Radius
2	3	4	<b>Spectrum/8 Series III</b> SuperMac Technology
6	—	5	<b>Microtech Memory Expansion Kit</b> Microtech International

## UTILITY SOFTWARE

3	3	1	<b>SAM</b> Symantec
3	4	2	<b>Macintosh Tools Deluxe**</b> Central Point Software
2	5	3	<b>Fastback II</b> Fifth Generation Systems
3	1	4	<b>Adobe Type Manager</b> Adobe
3	2	5	<b>SUM II</b> Symantec

## PRODUCT WATCH

Recent or forthcoming products of particular interest.

**DoveFax** *Dove*

Desktop data and fax modem

**Color MacCheese** *Delta Tao*

Inexpensive 24-bit color paint program

**Spectrum/24 PDQ** *SuperMac Technology*

Graphics acceleration board

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during March 1990.

\*Does not include hard disks installed at the factory.

\*\*Formerly PC Tools Deluxe for the Macintosh.





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80Q	\$599	\$649
105Q	\$649	\$699
135	\$899	\$999
180	\$999	\$1,099
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MAC IIcx  
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2-PAGE MONITOR  
101 EXT. KEYBO  
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# The Study of Supply and Demand Performance In Mac

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Ehman is now a leading manufacturer of Macintosh peripherals because we understand the real law of supply and demand: You need add-on peripherals, and we make them affordable.

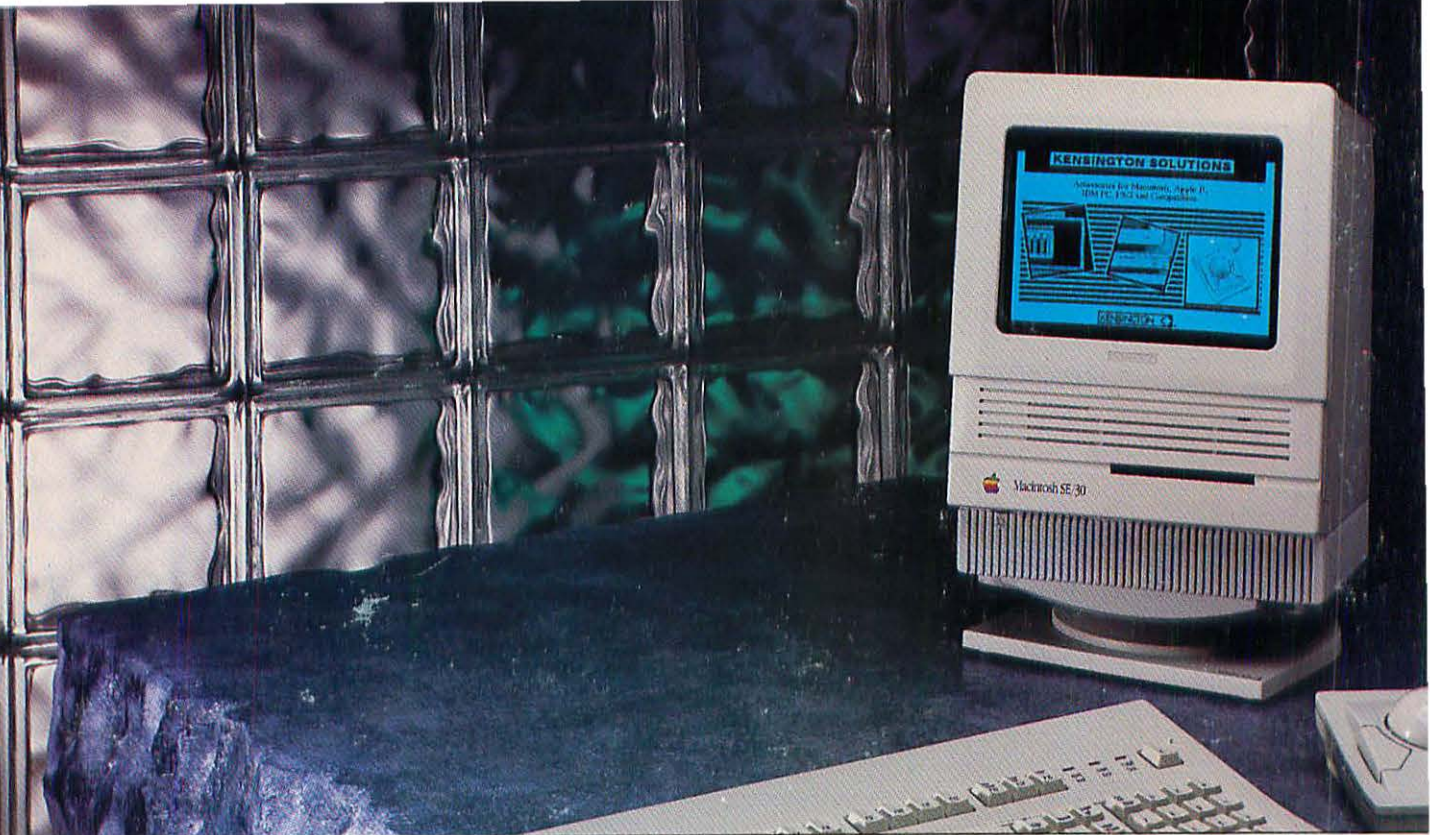
It doesn't take a rocket scientist to tell you that because our quality is comparable to any on the market and our prices are lower, Ehman peripherals really are a better buy. Since 1985, tens of thousands

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We even make one peripheral, a 45 MB Removable hard drive, that Apple doesn't. It's the





# EYESORE VS. EYE PROTECTION

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

Yet, the irony is that something so good for your eyes can be such an eyesore.

In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

Kensington has a different idea.

Instead of making a filter that will fit on any monitor, we make filters

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An example is our Maccessories® SE Anti-Glare Filter.

It looks so much a part of the SE, you would think it was designed by the same people who designed the SE.

Circle 30 on reader service card

The styling is complementary. The color identical. Even the same material is used.

And unlike generic filters, the fit is perfect. So light passes through the filter, never around it.

Kensington uses only optical quality glass with a ceramic anti-reflection and scratch-resistant coating.

The result is a 96% reduction in glare. And an improvement in contrast and clarity of up to 20 times.

In short, the most advanced eye-protection system you can find today—it even filters out VLF and ELF radiation and dissipates static.

Kensington has custom designed screens for the Mac, Mac Plus, Mac SE, Apple IIGS, as well as for the entire Mac II family of large screen monitors.

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